

Exercise 5

Repeated multiplication



From the school book

1 Complete :

a $7 \times 7 \times 7 = 7^{\dots}$

b $8 \times 8 \times 8 \times 8 \times 8 \times 8 = 8^{\dots}$

c $6 \times 6 \times 6 \times 6 = \dots$

d Two to the seventh power = 2^{\dots}

e Ten to the twelfth power = \dots

f Four cubed = \dots

g Five squared = \dots

h Seven to the zero power = \dots

i $2^3 + 2^2 = \dots$

(Cairo 2013)

j $5^{\text{zero}} = \dots$

(El-Kalyoubia 2014)

k $(-7)^{\text{zero}} + (7)^{\text{zero}} = \dots$

(El-Gharbia 2015)

l $(-1)^{10} + (-1)^{11} = \dots$

(El-Fayoum 2012)

m $\frac{a^m}{a^n} = a^{\dots}$ where $m, n \in \mathbb{Z}^+$, $m > n$

(Suez 2016)

n $3^5 \div 3^3 = \dots$

(Matrouh 2013)

o $(-4)^9 \div (-4)^7 = \dots$

(El-Beheira 2017)

2 Find the value of each of the following :

a 2^3

b 3^2

c 5^3

d 10^4

e $(-7)^2$

f $(-2)^3$

g $(-6)^3$

h $-(9)^2$

i 5^0

j $(-8)^0$

k $(-1)^{50}$

l $(-1)^{51}$

3 Find the value of each of the following :

a $2^2 \times 2^3$

b $(10)^3 \times (-10)^4$

c $(-5)^3 \times 5^2$

d $-(2)^4 \times 2^2$

e $b^8 \times b^2$

f $7 \times 7^3 \times 7^2$

4 Find the value of each of the following :

a $2^7 \div 2^5$

c $5^6 \div 5^6$

e $(-6)^5 \div (-6)^3$

g $(-5)^5 \div 5^3$

b $3^4 \div 3^3$

d $3^7 \div 3^4$

f $(-4)^5 \div (-4)^2$

h $a^6 \div a^3, a \neq 0$

(Assiut 2012)

5 Find the value of each of the following :

a $2^3 \times 3^2$

d $(-4)^3 \times (-1)^5$

g $-(4)^2 \times (-2)^3$

j $(-2)^4 + (-3)^3$

m $2^4 + 3^3 - 4^2$

b $(-5)^2 \times 2^2$

e $(-5)^3 \times (-1)^{17}$

h $2^3 + 2^2$

k $(-1)^{30} + (-1)^{31}$

n $3^4 \times 3^2 \times 2^2 \times 2^3$

c $(-1)^2 \times (-2)$ (Giza 2014)

f $(-1) \times 2^3$

i $(-2)^3 + 3^2$

l $(-1)^{50} + (-1)^{100}$

o $(-2)^2 \times (2^3)^2$

6 Find the value of each of the following :

a $\frac{5 \times 5^3}{5^4}$

c $\frac{3^7}{3^3 \times 3^2}$

e $\frac{(-3)^3 \times (-3)^4}{(-3)^5}$

g $\frac{(-3)^4 \times (-3)^5}{(-3)^6 \times (-3)}$

i $\frac{3^2 \times (-3)^5}{3^4}$

k $\frac{(-2)^6 \times 2^4}{2^7 \times 2}$

b $\frac{7^4 \times 7^5}{7^7}$

d $\frac{2^6 \times 2^5}{2^3 \times 2}$

f $\frac{(-5)^5 \times (-5)^4}{(-5)^6}$

h $\frac{(-8)^3 \times 8^4}{(-8)^7}$

j $\frac{(-2)^7 \times (-2)^5}{2^{10}}$

l $\frac{9^6 \times (-9)^3}{9^2 \times (-9)^5}$

(Giza 2013)

(Suez 2015)

(North Sinai 2017)

(Souhag 2013)

(Aswan 2012)

(Ismailia 2012)

(El-Beheira 2014)

(El-Menia 2016)

(Kafir El-Sheikh 2017)

Unit One

$$m \frac{(-5)^{10} \times (-5)^8}{-5 \times (-5)^5 \times (-5)^{11}}$$

$$o \frac{2^2 + 2^3}{2^4}$$

$$n \frac{(-3)^6}{(-3)^3} + \frac{(-4)^5}{(-4)^3} \quad (\text{El-Dakahlia 2015})$$

$$p \frac{2^6}{2^3} + (-1)^5 \quad (\text{South Sinai 2013})$$

7 Simplify each of the following to its simplest form :

$$a \frac{a^6 \times a^3}{a^5} \quad \text{where } a \neq 0$$

$$b \frac{a^{12}}{a^9 \times a^2} \quad \text{where } a \neq 0$$

$$c \frac{x^8}{x^5 \times x^3} \quad \text{where } x \neq 0$$

$$d \frac{x \times x^3 \times x^{10}}{x^2 \times x^7} \quad \text{where } x \neq 0$$

8 Simplify each of the following to its simplest form :

$$a \frac{5^4 \times 3^3}{3^2 \times 5^2}$$

$$b \frac{(-2)^5 \times 3^7}{3^3 \times (-2)^3}$$

$$c \frac{(-4)^4 \times (-3)^2}{4^2 \times (-3)}$$

$$d \frac{x^5 \times y^6}{y^3 \times x^2} \quad \text{where } x, y \neq 0$$

9 Arrange in an ascending order :

$$a \text{ } \left[\text{book icon} \right] (-2)^5, (-3)^4, (-4)^0, (-1)^{15} \text{ and } 3^2$$

$$b 2^3, 3^2, (-2)^3, (100)^0 \text{ and } (-1)^5$$

10 Arrange in a descending order :

$$a (-2)^3, (-2)^2, (-2)^0 \text{ and } (-1)^5$$

$$b 10^2, (-1)^5, 1000 \text{ and } (1000)^{\text{zero}}$$

(Damietta 2013)

$$c \left[\text{book icon} \right] 10^2, (-1)^5, 100^2, (-10)^3 \text{ and } 1000000$$

11 Put [$<$, $>$ or $=$] :

$$a 2^5 \dots\dots\dots 5^2$$

$$b \left[\text{book icon} \right] 4^2 \dots\dots\dots 8$$

$$c (-5)^2 \dots\dots\dots 25$$

$$d (-7)^2 \dots\dots\dots 14$$

e $(-4)^5 \dots\dots (-4)^2$

g $(-3)^3 \dots\dots 2^3$

i $(-5)^3 \dots\dots (-1)^0$

k $|-8| \dots\dots 2^3$

m $(-2)^4 + (-3)^3 \dots\dots 1$

f $(-6)^2 \dots\dots (-12)$

h $9^2 \dots\dots (-3)^4$

j $(-1)^6 \dots\dots (-1)^7$ (Damietta 2012)

l $7^5 \div 7^5 \dots\dots 1$

n $2^2 + 2^3 \dots\dots 2^2 \times 2^3$

12 Choose the correct answer :

a $(-5)^2 \dots\dots \mathbb{N}$ (\in or \notin or \subset or $\not\subset$)

b $(-3)^5 \dots\dots \mathbb{N}$ (\in or \notin or \subset or $\not\subset$)

c $(-11)^0 \dots\dots \mathbb{N}$ (\in or \notin or \subset or $\not\subset$)

d The additive inverse of $(-8)^0$ is $\dots\dots$ (8 or -8 or 1 or -1)

e The additive inverse of $(-1)^3$ is $\dots\dots$ (1 or -1 or 3 or -3)

f $3^2 \times 3^3 = 3 \dots\dots$ (Giza 2014) (5 or 3 or 2 or 1)

g $2^3 \div 2^2 = \dots\dots$ (El-Beheira 2013) (2 or 8 or 16 or 32)

h $3^7 \div 3^7 = \dots\dots$ (Ismailia 2014) (0 or 1 or 3 or 7)

i $2^6 \times 2^2 \div 2^7 = \dots\dots$ (El-Gharbia 2014) (2^8 or 2^{12} or 2^5 or 2)

j $2^5 \div 2^5 = 3 \dots\dots$ (El-Dakahlia 2017) (2 or 10 or zero or 1)

k $(3)^0 + (-3)^0 = \dots\dots$ (South Sinai 2012) (6 or 0 or 1 or 2)

l $(-1)^3 - 1 = \dots\dots$ (Cairo 2017) (-2 or 0 or 1 or 2)

m $2^2 + 2 = \dots\dots$ (6 or 8 or 2^3 or 4^3)

n $3^3 - 3^2 = \dots\dots$ (3 or 3^5 or 3^6 or 18)

o $(-3)^3 + (-3)^2 = \dots\dots$ (Souhag 2013) ($(-3)^5$ or $(-3)^6$ or -18 or 18)

p $3^2 + 3^2 + 3^2 = \dots\dots$ (Aswan 2015) (2^6 or 4^6 or 3^3 or 2^9)

Unit One

- q $(-5)^2 + 5 = \dots\dots\dots$ (5^2 or 20 or 15 or 30)
- r $(-1)^{100} + (-1)^{101} = \dots\dots\dots$ (El-Monofia 2016) (zero or -1 or 1 or -2)
- s $\frac{7^5}{7^4} + 1 = \dots\dots\dots$ (7 or 1 or 8 or 7^2)
- t $(-2)^{20} \div 2^{15} = \dots\dots\dots$ (2^5 or $(-2)^5$ or 2^{35} or $(-2)^{35}$)
- u $2^8 \div 2^4 = \dots\dots\dots$ (2^{12} or 2^2 or 2×2^3 or 8)
- v If $3^5 \div 3^a = 3^0$, then a = $\dots\dots\dots$ (4 or 5 or -5 or 0)
- w Which of the following is the nearest to : $11^2 + 9^2$?
(22 + 18 or 211 + 29 or 120 + 20 or 120 + 80)
- x If $x = 1$, $y = -2$, then the negative number in the following is $\dots\dots\dots$
(El-Gharbia 2013) ($x + y^2$ or $x^2 - y$ or $x^2 + y$ or $x^2 + y^2$)
- y If F is an odd number, then the even number in the following is $\dots\dots\dots$
(El-Sharkia 2016) (F^2 or $F^2 + F$ or $2F + 1$ or F^3)

13 If $n = 2$, then find the value of each of the following :

- a n^2 | b $3n^7$ | c $n^4 + 5$
d $n^3 - 1$ | e $\frac{n^6}{8}$ | f $2n^5 + 1$

14 If $a = 2$ and $b = -3$, find the value of each of the following :

- a $3a^2b$ | b $2a + 3b$ | c $a^2 + b^2 + ab$ (Alexandria 2013)

15 If $a = 3^2$, $b = 2^3$ Find the value of : $(a - b)^{10}$ (El-Gharbia 2015)

16 Use the distributive property to calculate the value of each of the following :

- a $(17)^2 + 17 \times 83$ | b $33 \times 23 - (23)^2$
c $(27)^2 + 27 \times (-17)$ | d $(23)^2 + 23 \times 78 - 23$

Exercise 6

Numerical patterns



From the school book

1 Complete in the same pattern :

a 1, 2, 3, 4,,

b 7, 10, 13,,

c -10, -8, -6, -4,,

d -8, -5, -2, 1, 4,,

e -15, -12, -9,,

f -2, -4, -6, -8,,

g 2, 4, 8, 16,,

h 3, 9, 27,,

(Assiut 2017)

(El-Sharkia 2011)

(Beni Suef 2013)

(Souhag 2012)

2 Complete in the same pattern :

a 1, -1, -3, -5,,

b 3, -6, 12, -24,,

c -6, -4, -2,,

d 9, 6, 3, 0,,

e 16, 12, 8, 4,,

f -3, 9, -27,,

(Alexandria 2011)

(Kafir El-Sheikh 2016)

(Ismailia 2011)

3 Complete in the same pattern :

a 2, -6, 18, -54,,

b -5, -10, -15, -20,,

c 3, -3, 3, -3,,

d -20, -18, -16,,

e 1, 3, 6, 10,,

(Aswan 2011)

Unit One

f $8, 4, 2, \dots, \dots, \frac{1}{4}$

g $1, 1, 2, 3, 5, 8, \dots, \dots$

(Aswan 2013)

4  Complete the following numerical patterns by writing three consecutive numbers :

a $6, 14, 22, 30, 38, \dots, \dots, \dots$

b $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots, \dots, \dots$

(El-Beheira 2016)

c $2, 3, 5, 8, 13, \dots, \dots, \dots$

(El-Kalyoubia 2013)


d $1, 4, 9, 16, 25, \dots, \dots, \dots$

5 Discover the rule of the numerical pattern , then complete in the same pattern :

a $160, 80, 40, 20, \dots, \dots$

b $1, 3, 7, 15, \dots, \dots$

c $1, 4, 5, 9, 14, \dots, \dots$

d  $\frac{1}{3}, \frac{2}{3}, 1, \frac{4}{3}, \dots, \dots$

(Kafr El-Sheikh 2015)

6  Discover the rule of the numerical pattern and write the missing numbers in each case :

a $4, 7, \dots, 13, 16, \dots, \dots$

b $7, \dots, 15, 19, 23, \dots, \dots$

(Aswan 2015)

c $0.5, 1, \dots, 2, 2.5, \dots, \dots$

d $128, 64, \dots, 16, 8, \dots, \dots$

e $\dots, 15, 12, 9, \dots, \dots$

LESSON

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7 Complete the following table :

The numerical pattern	Description of the pattern
3 , 7 , 11 , 15 , 19 , 23 , .....	.....
.....	Each number is more than its preceding by 5
$\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1 , $\frac{5}{4}$ , .....	.....
.....	Each number is less than its preceding by 4
3 , 9 , 27 , 81 , .....	.....

8 Describe the pattern in words , then complete in the same pattern :

- a 2 , 7 , 12 , 17 , ,
- b 3 , 7 , 11 , 15 , ,
- c 6 , 9 , 12 , 15 , ,
- d 81 , 76 , 71 , 66 , ,
- e 1 , 3 , 9 , 27 , ,
- f 192 , 96 , 48 , 24 , ,

9 Write the number of line segments below each shape , and then write the numerical pattern and describe it :



Number of line segments :

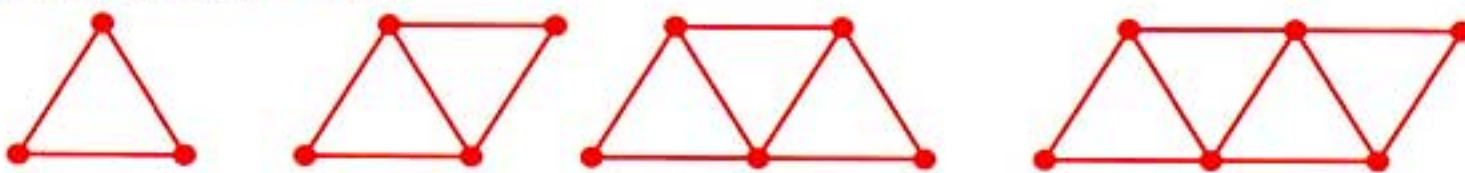
The numerical pattern :

Description of the pattern :

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Unit One

10 Write the number of triangles below each shape, and then write the numerical pattern and describe it:



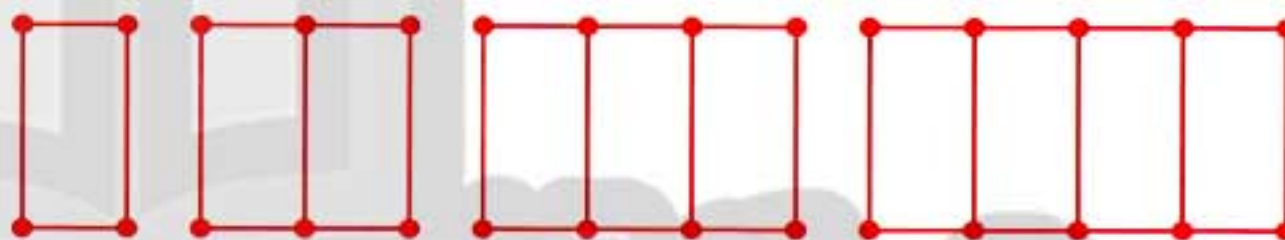
Number of triangles :

The numerical pattern :

Description of the pattern :

Using the number of line segments, write another pattern and describe it.

11 Deduce the pattern rule expressing the following design, then write the numerical pattern:



Number of line segments :

The numerical pattern :

The pattern rule :

12 Write the number of dots below each figure of the following:

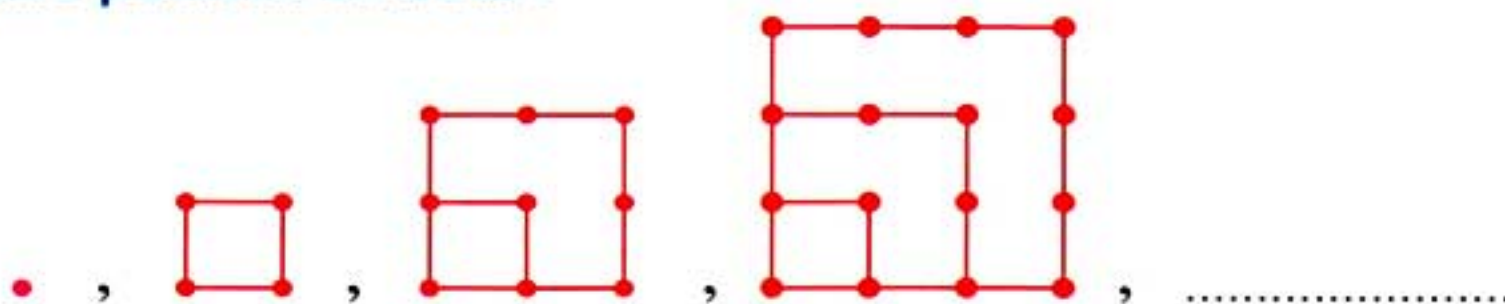


Number of dots :

The numerical pattern :

The rule of the pattern :

13 Look at the pattern of dots:



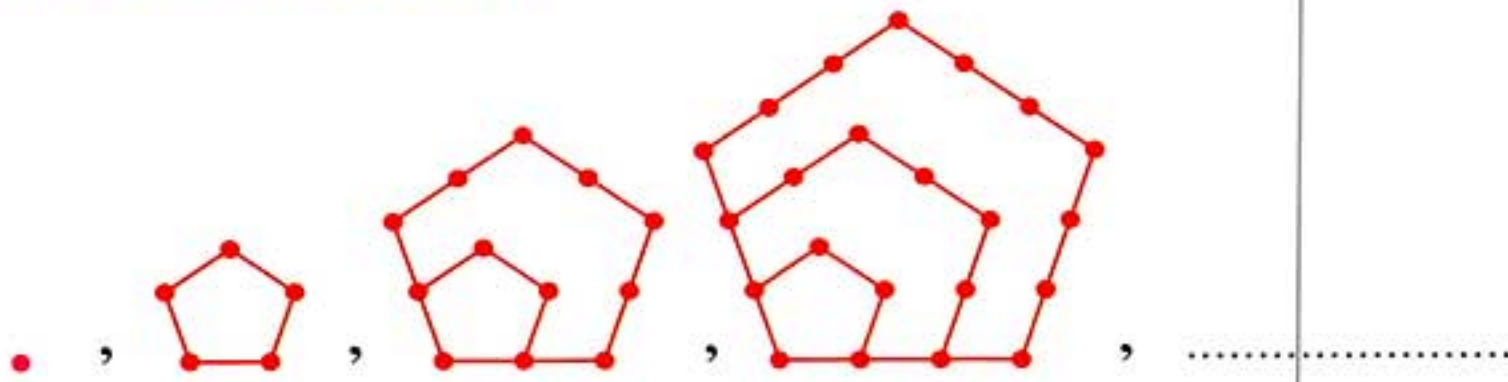
a How many dots will be there in the 5th shape ?

b Draw the 5th shape in the pattern.

LESSON

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14 Look at the pattern of dots :



- a Draw the 5th shape in the pattern.
b How many dots will be there in the 7th shape ?

15 Write the number of chords below each shape , then find the number of chords that will be in the 6th shape :



16 An Egyptian land company reclaims 6 feddans per day to become prepared and ready for agriculture.
How many days do the company require to reclaim about 50 feddans ?
Write the numerical pattern which expresses this and describe it.

17 Karim saves L.E. 52 every month.
How many months does he need to save about L.E. 160 ?
Write the numerical pattern which expresses this and describe it.

18 Khaled decided to lose weight at the rate of 3 kg. monthly.
If he is 90 kg. heavy right now , then how many months does he need to reach 69 kg. ?
Write expressing the numerical pattern and describe it.

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Exercise 7

Equation and inequality of the first degree



From the school book

1 Determine which of the following represents an equation or an inequality and give reasons :

a $2x + 1 = 5$

b $3x + 2 = 11$

c $2x > 9$

d $x = 7 + 2$

e $x > 7 - 5$

f $x < -25$

g $2x = 24$

h $2y + 3 \leq 5$

i $5x \geq 30$

2 Determine the degree of each of the following :

a $x - 7 = 1$

b $4b - 3 = 5$

c $3x - 9 = 2$

d $3x^2 - 6 = 14$

e $3x^3 + x + 4 = 0$

f $5x + 2 > 7$

g $x - 2y = 5$

h $3x - 2 < -2$

i $3x^4 - 5 \leq 7$

j $x^3 - 4x^2 = 0$

k $4x + 3y^2 > 2$

l $x^4 + 2x = 3$

3 Express symbolically each of the following :

a x is less than -3

b x is less than or equal to 2

c x is greater than or equal to 3

d x is greater than -4 and less than 1

e x is less than or equal to 7 and greater than 1

f x is greater than or equal to -2 and less than or equal to 5

4 Find the solution set of each of the following equations :

a $x + 7 = 10$ if the substitution set is $\{1, 3, 5\}$

b $x + 5 = 12$ if the substitution set is $\{3, 5, 7, 8\}$ (Suez 2015)

- c $2x + 1 = 5$ if the substitution set is $\{-1, -2, 0, 2\}$
- d $x + 4 = 0$ if the substitution set is $\{1, 2, 3, 4\}$
- e $4x - 3 = 9$ if the substitution set is $\{2, 3, 4\}$
- f $2x - 5 = -1$ if the substitution set is $\{0, 1, 2, 3\}$ (El-Sharkia 2011)
- g $-2 + 3x = 7$ if the substitution set is $\{0, 1, 2\}$
- h $1 + 2x = 16$ if the substitution set is $\{7, 8, 9\}$
- i $3x + 5 = -4$ if the substitution set is $\{0, -1, -2, -3\}$
- j $2x + 3 = 9$ if the substitution set is $\{2, 3, 4\}$ (Damietta 2016)

5 Find the solution set of each of the following inequalities :

- a $x + 3 < 5$ if the substitution set is $\{4, 3, 2, 1, 0\}$ (El-Gharbia 2012)
- b $x - 4 > 1$ if the substitution set is $\{7, 6, 5, 4\}$
- c $2x - 3 > 1$ if the substitution set is $\{-1, 0, 1, 2, 3\}$
- d $3x - 1 > -2$ if the substitution set is $\{-2, -1, 0, 1, 2\}$
- e $3x + 4 \leq -2$ if the substitution set is $\{-1, 0, 1, 2, 3\}$
- f $-x + 1 < 4$ if the substitution set is $\{-3, -2, 0, 2, 3\}$
- g $2x + 5 > 2$ if the substitution set is $\{-3, -2, -1, 0, 1\}$
- h $5x - 1 > 4$ if the substitution set is $\{2, 3, 4, 5, 6\}$

6 Given that the substitution set is $M = \{1, 2, 3, 7\}$:

(Suez 2012)

- a Find the solution set of the equation : $2x - 5 = 1$
- b Find the solution set of the inequality : $x + 3 > 8$

Unit Two

7  Considering the set of substitution is $M = \{-1, -2, 0, 2\}$, find the solution set of each of the following :


a $2x + 1 = 5$

b $x - 3 < -1$

8 Find the solution set of each of the following equations :

a $3(x - 2) = -6$ if the substitution set is $\{7, 8, 9\}$

b $2x + 1 = x - 3$ if the substitution set is $\{2, 4, -1, -4\}$

c  $2(x - 3) = x + 1$ if the substitution set is $\{4, 5, 6, 7\}$

d $x \times 5 = x + 5$ if the substitution set is $\{1, 2, 3, 4, 5\}$

e $\frac{3x}{2} = x + 3$ if the substitution set is $\{4, 6, -2, 0\}$

9 Complete each of the following :

a The equation is a mathematical statement includes relation between two sides.

b The equation $x + 3 = 5$ is of the degree.

(El-Fayoum 2016)

c The equation $x^2 - 3 = 6$ is of the degree.

(Giza 2017)

d The solution set of the equation $2x - 1 = -1$ is if the substitution set is $\{0, 1, 2, 3\}$

e The solution set of the inequality $3x + 1 < 0$ is if the substitution set is $\{0, -3, 3\}$

10 Choose the correct answer from those given :

a  Which of the following represents an equation ?

(a) $x - 17$

(b) $22 - 7 = 15$

(c) $x > -11$

(d) $2x + 3 = 7$


b The equation $x^3 - 4x^2 = 0$ is an equation of degree. (Beni Suef 2015)

(a) first

(b) second

(c) third

(d) fourth

- c  The equation $x^2 + 3 = 4$ is of degree. (Luxor 2015)
 (a) first (b) second (c) third (d) fourth
- d The number which satisfies the inequality : $x < -1$ is (Ismailia 2017)
 (a) zero (b) 1 (c) 2 (d) -2
- e All the following numbers satisfy the inequality : $x > -3$ except
(Assiut 2017)
 (a) zero (b) -4 (c) -1 (d) -2
- f The greatest integer that satisfies the inequality : $x < 6$ is
(Alexandria 2013)
 (a) 3 (b) 5 (c) 8 (d) 6
- g The number that satisfies the inequality : $x - 2 > 3$ is
(Assiut 2012 , Port Said 2017)
 (a) 3 (b) 4 (c) 5 (d) 6
- h The number -5 is a solution to the equation where the substitution set is \mathbb{Z}
 (a) $x - 3 = 2$ (b) $2x - 1 = 9$
 (c) $-2x + 3 = 13$ (d) $x + 3 = 2x + 12$
- i If 3 is a solution to the equation : $2x - 4 = a$, then $a =$
 (a) 3 (b) 2 (c) -2 (d) -3
- j The set of substitution is $\{1, 2, 3, 4\}$, then the set of solution of the equation $x + 6 = 10$ is
(Alexandria 2016)
 (a) $\{1\}$ (b) $\{2\}$ (c) $\{3\}$ (d) $\{4\}$
- k If the substitution set is $\{2, -1, 3, 4\}$, then the solution set of the equation : $2x + 3 = 3$ is
 (a) $\{0\}$ (b) $\{-1\}$ (c) $\{3\}$ (d) \emptyset

Exercise 12

Area of the circle



From the school book

1 Find the area of each of the following circles (Consider $\pi = 3.14$):

a



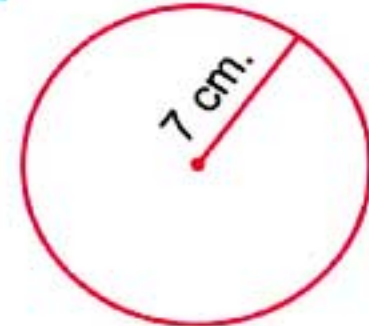
Area =

b



Area =

c



Area =

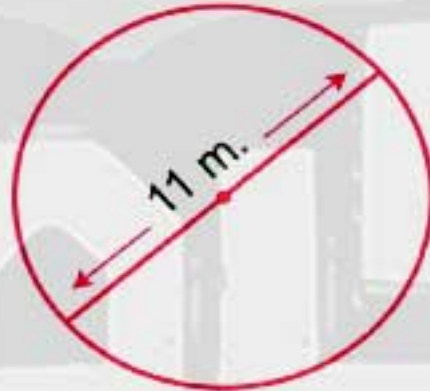
(Suez 2014)

d



Area =

e



Area =

f



Area =

2 Find the area of each of the following circles for the given radius. Round your answer to the nearest hundredth (Consider $\pi = 3.14$):

a $r = 8$ cm.b $r = 3.6$ m.c $r = 5$ km.d $r = 1.4$ m.e $r = 6.3$ mm.f $r = 78.4$ dm.

3 Find the area of each of the following circles for the given diameter. Round your answer to the nearest hundredth (Consider $\pi = 3.14$):

a $d = 16$ cm.b $d = 21$ m.c $d = 1.4$ cm.d $d = 40$ mm.e $d = 18.8$ dm.f $d = 28$ km.

4 Calculate the area of a circle of radius length 7 cm. (Consider $\pi = \frac{22}{7}$)

(Souhag 2015)

Unit Three

5 A circle with radius length 4 cm. Calculate its area. (Consider $\pi = 3.14$)

(Luxor 2011)

6 A circle, its diameter is 12 cm. Calculate its area.

(Consider $\pi = \frac{22}{7}$ or 3.14)

(El-Sharkia 2016)

7 A circle, its diameter length is 20 cm. Find its surface area.

(Consider $\pi = 3.14$)

(Souhag 2017)

8 Find the area of a circle with diameter of length 17.5 cm. (Consider $\pi = \frac{22}{7}$)

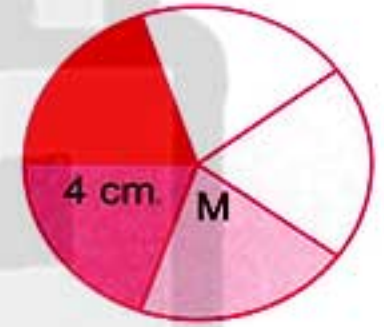
9 A circle, its diameter is 14 cm. Calculate its surface area and its circumference. (Consider $\pi = \frac{22}{7}$)

(El-Monofia 2015)

10 In the opposite figure :

A circle M of radius 4 cm, is divided into five equal circular sectors.

Calculate the surface area of one sector. (Consider $\pi = 3.14$)

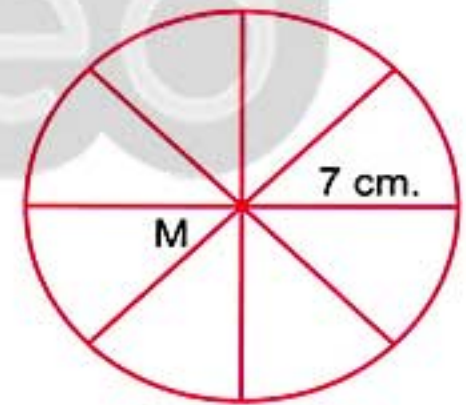


11 In the opposite figure :

A circle M of radius length 7 cm, is divided into eight equal circular sectors.

Calculate the area of one sector. (Consider $\pi = \frac{22}{7}$)

(Matrouh 2015)



12 A circular birthday tart the diameter of its upper base equals 25 cm. is divided into eight equal circular sectors, then find the area of one sector "Approximating the result to the nearest integer"

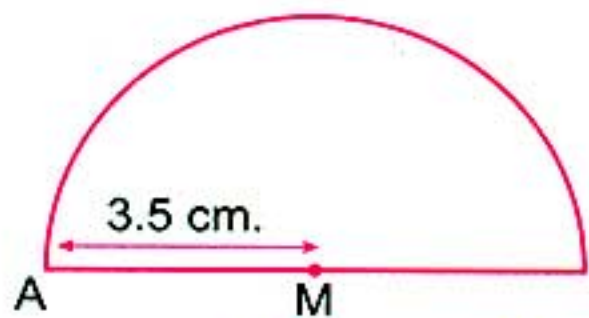
(Consider $\pi = \frac{22}{7}$ or 3.14)

3

Lesson

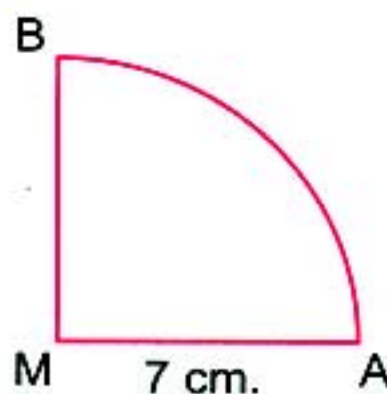
13 Find the area of each of the following figures (Consider $\pi = \frac{22}{7}$):

(a)

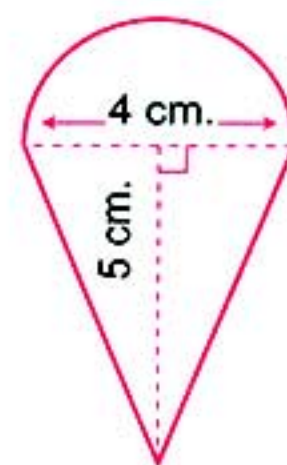


«Souhag 2014»

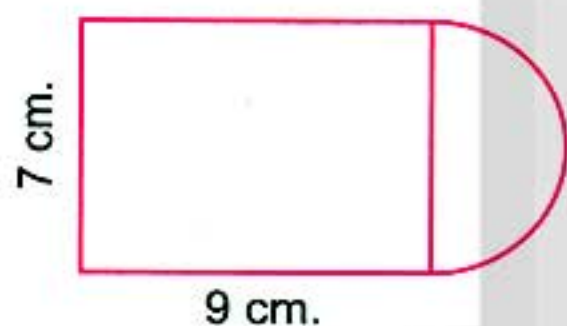
(b)



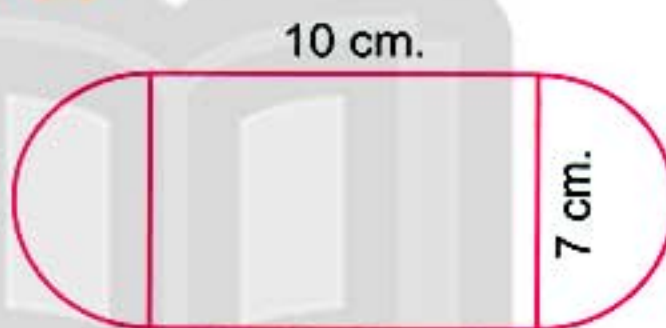
(c)



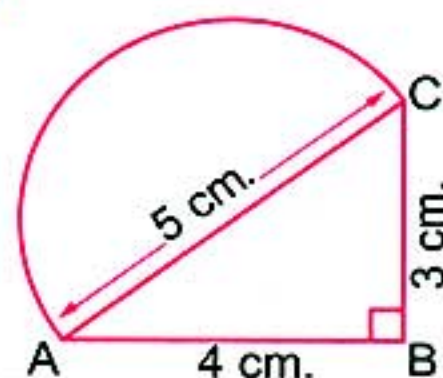
(d)



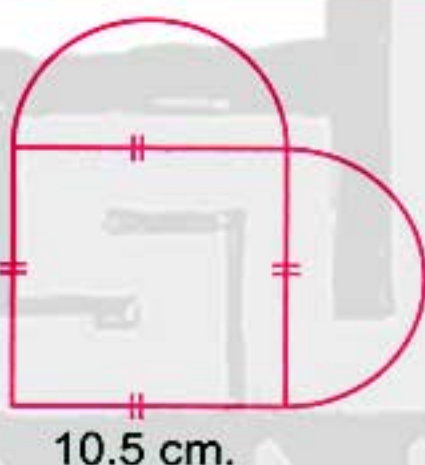
(e)



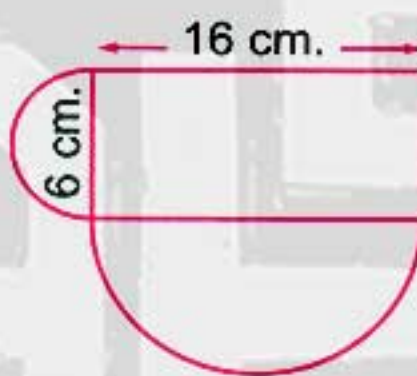
(f)



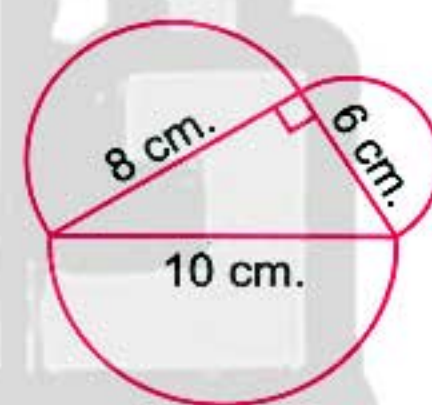
(g)



(h)



(i)



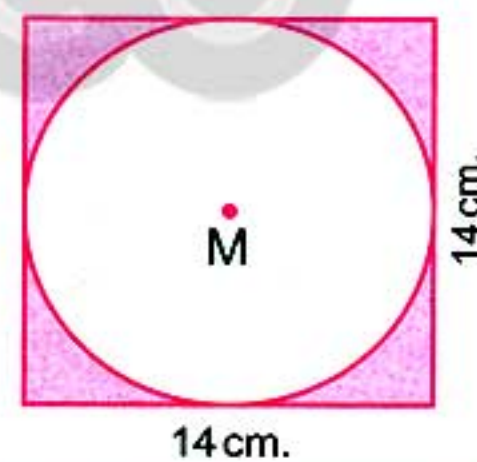
14 In the opposite figure :

Circle M is drawn inside a square of side length 14 cm. and touches its sides.

Calculate the area of the coloured part.

(Consider $\pi = \frac{22}{7}$)

«Damietta 2012»

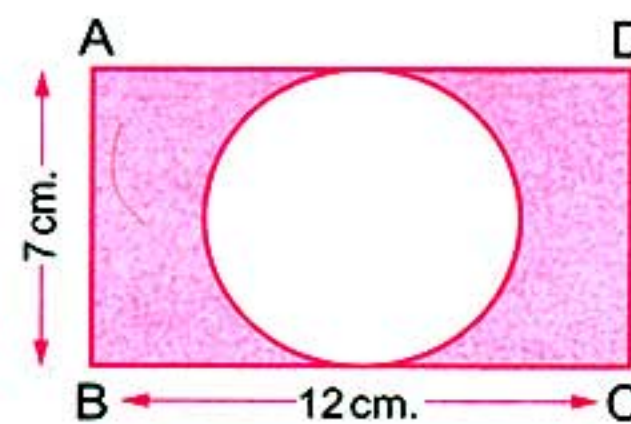


15 In the opposite figure :

ABCD is a rectangle its length 12 cm. and its width 7 cm. Calculate the area of the coloured part.

(Consider $\pi = \frac{22}{7}$)

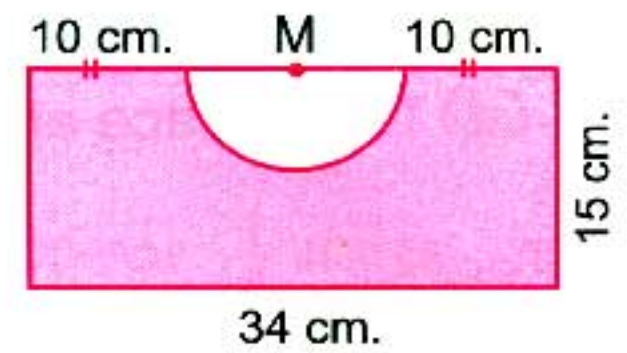
«El-Kalyoubia 2017»



16 In the opposite figure :

A rectangle where its length = 34 cm. and its width = 15 cm. , and a semicircle of centre M
Calculate the area of the coloured part.
(Consider $\pi = \frac{22}{7}$)

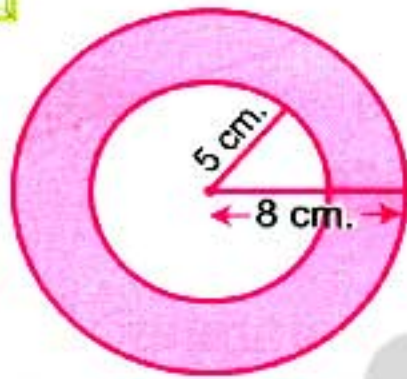
«Red Sea 2013»



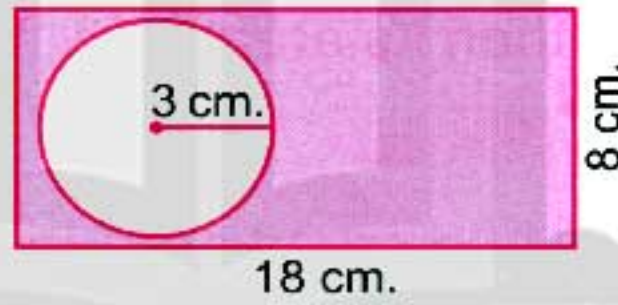
17 Find the area of the coloured part of each of the following figures

(Consider $\pi = 3.14$) :

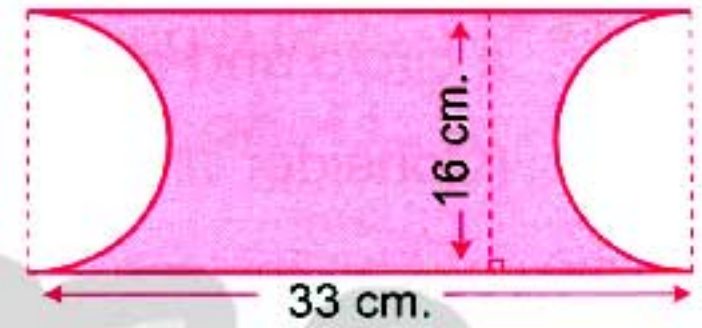
(a)



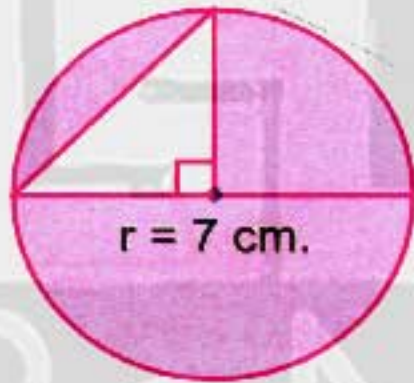
(b)



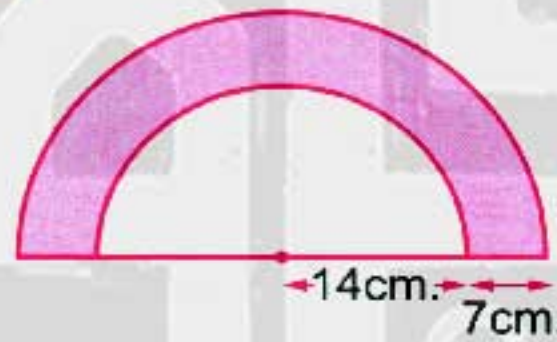
(c)



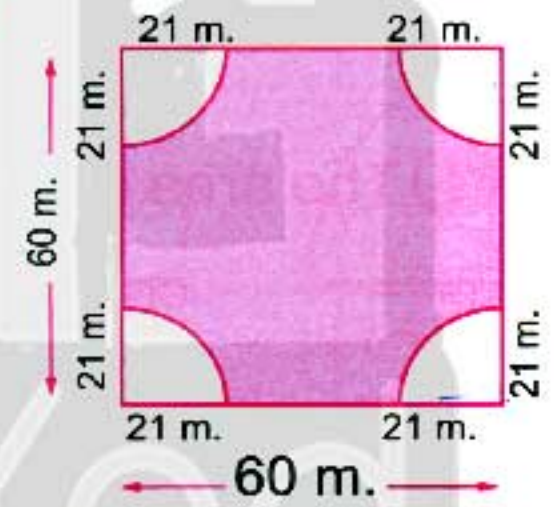
(d)



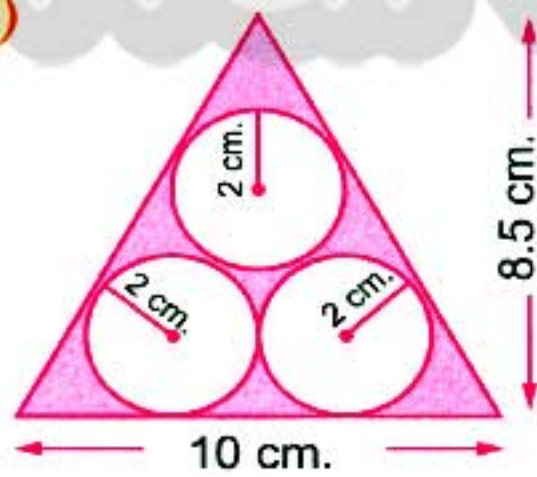
(e)



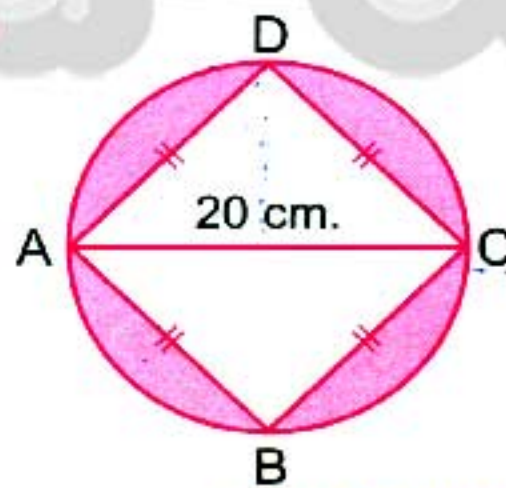
(f)



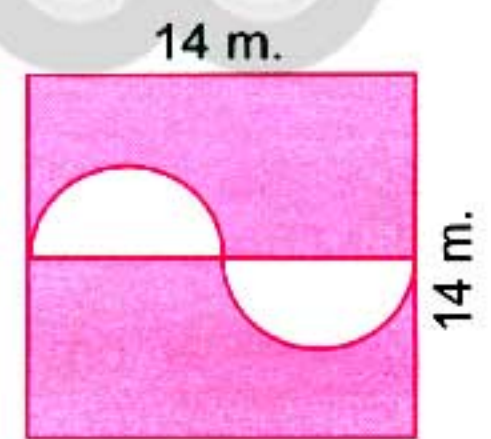
(g)



(h)



(i)

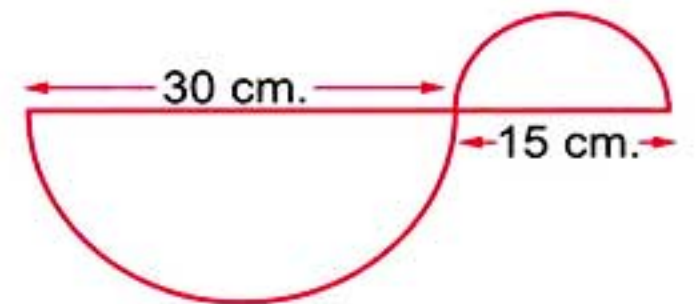
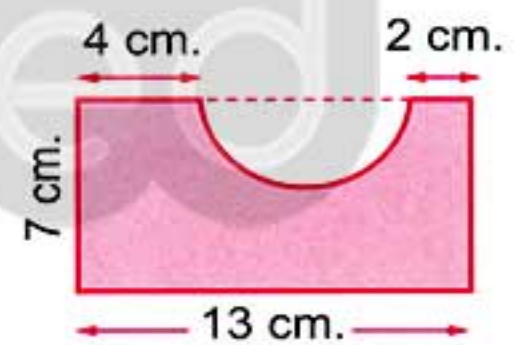
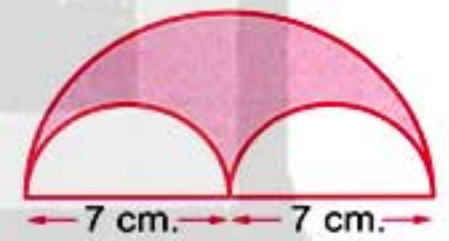
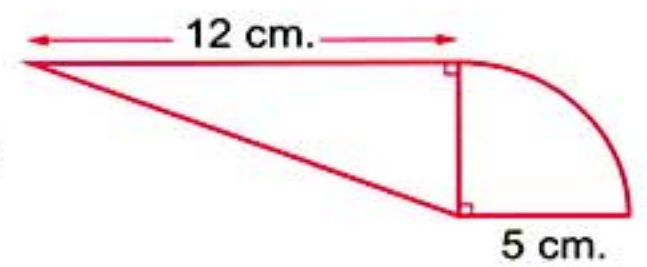


«Ismailia 2011»

18 Complete :

- (a) The surface area of the circle = «Cairo 2012 - Matrouh 2015»
- (b) The radius length of a circle is 14 cm. , then its circumference = cm. and its area = cm² (Consider $\pi = \frac{22}{7}$)

- c The diameter of a circle is 20 cm. , then its circumference = cm.
and its area = cm^2 (Consider $\pi = 3.14$)
- d The surface area of the circle of radius length 7 cm. = $\pi \text{ cm}^2$
(Beni Suef 2016)
- e A circle, its area is $25 \pi \text{ cm}^2$, then the length of its radius is cm.
(Damietta 2016)
- f If the circumference of a circle is $30 \pi \text{ mm}$. , then the area of this circle equals
- g The opposite figure is formed of a quarter of a circle and a triangle , then its area = cm^2
(Consider $\pi = 3.14$)
- h The area of the opposite figure = cm^2 (Consider $\pi = \frac{22}{7}$)
- i The area of the coloured part = cm^2 (Consider $\pi = \frac{22}{7}$)
- j The area of the coloured part = cm^2 (Consider $\pi = \frac{22}{7}$)
- k The area of the opposite figure = cm^2 (Consider $\pi = 3.14$)

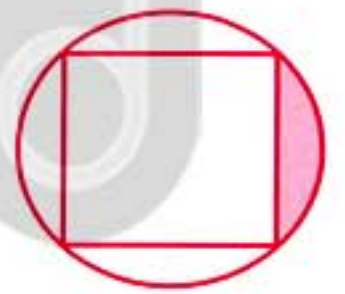
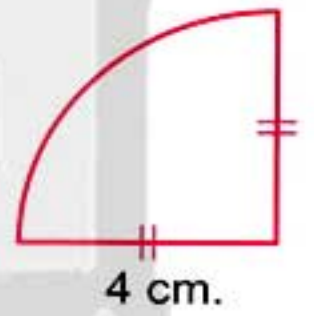
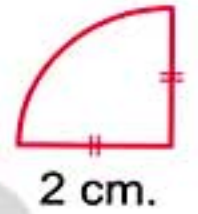


19 Choose the correct answer :

- a The area of a circle =
(πr or πr^2 or $2 \pi r$ or $2 \pi r^2$) (Qena 2017)
- b The circumference of a circle =
(πr or $2 \pi r$ or πr^2 or $2 \pi r^2$)


Unit Three


- c A circle, its radius length is 3.5 cm. , then the surface area = cm²
(Consider $\pi = \frac{22}{7}$) (El-Sharkia 2012) (11 or 22 or 38.5 or $38\frac{1}{8}$)
- d A circle with radius length = 1 cm. , then its area = cm²
(Ismailia 2011) (π or 2π or $\frac{1}{2}\pi$ or π^2)
- e The area of the circle whose diameter length is 8 cm. = π cm²
(El-Menia 2015) (4 or 8 or 16 or 64)
- f A circle , its diameter length is 6 cm. , then its surface area = cm²
(Ismailia 2014) (3π or 6π or 9π or 36π)
- g The circumference of a circle is 44 cm. , then the length of its diameter is cm. (Consider $\pi = \frac{22}{7}$) (14 or 22 or 44 or 154)
- h The perimeter of the opposite figure = cm. (Souhag 2017)
(2π or 5π or $\pi + 4$ or $4\pi + 4$)
- i The area of the opposite figure = cm²
(16π or 4π or 2π or $4\pi^2$)
- j The area of the coloured part = cm²
where $r = 2$ cm.
($2 - \pi$ or $\pi - 2$ or $2 - 2\pi$ or $2 + 2\pi$)




20 A circle its circumference is 14π m. Calculate its area.

21 A circle its circumference is 2π cm. Calculate its area.

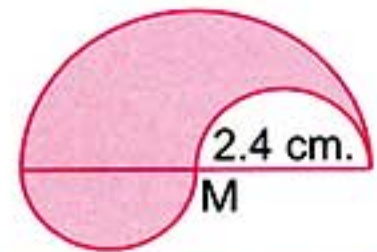
22  A circle its circumference is 88 cm. Find its radius length and its area.
(Consider $\pi = \frac{22}{7}$) (Alexandria 2015)


23  A circle its circumference is 62.8 cm. Calculate its area.
(Consider $\pi = 3.14$) (El-Beheira 2012)

24  A circle its circumference is 44 cm. Calculate its area. (Consider $\pi = \frac{22}{7}$)

25  In the opposite figure :

Find the area of the coloured part. (Consider $\pi = 3.14$)



26  A table its surface in the form of a circle , its diameter is 1.5 m. Its surface is wanted to be covered by a sheet of glass equal to its surface. Calculate the cost price if the square meter of the glass costs L.E. 60 (Consider $\pi = \frac{22}{7}$ or 3.14)



27 If the length of the outer diameter of a computer CD is 12 cm. , and the length of the inner diameter is 1.5 cm. Find the area of this CD. (Consider $\pi = 3.14$)



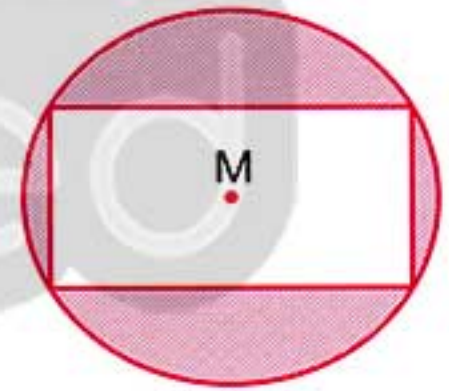
28 A garden , which is circular in shape , its circumference is 132 metres , find :

- The length of diameter of the garden in metre.
- The area of the garden in square metre. (Consider $\pi = \frac{22}{7}$)



29  In the opposite figure :

M is a circle of radius length 5 cm. , a rectangle is drawn inside it , its length is 8 cm. and width is 6 cm. Calculate the area of the shaded part. (Consider $\pi = \frac{22}{7}$ or 3.14)



30 Calculate the coloured area of the opposite figure if the radius of the large circle is 6 cm. and the radius of each of the small circles is 2 cm. (Consider $\pi = 3.14$)



For Excellent Pupils

31 A circle its area is 616 cm^2 . Calculate its radius length and its circumference. (Consider $\pi = \frac{22}{7}$)

Exercise 13

Lateral area and total area for each of the cube and the cuboid

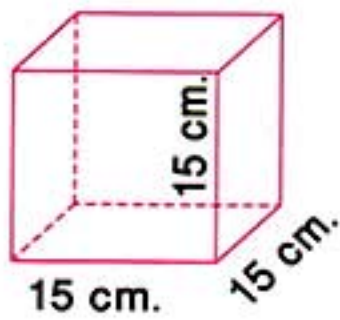


From the school book

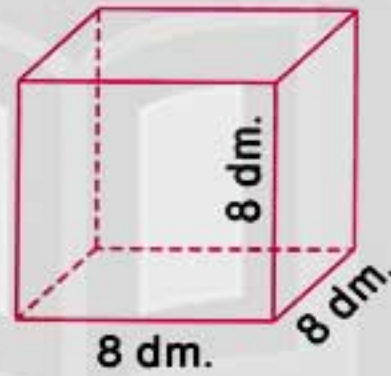
The cube

1 Calculate the lateral area and total area for each of the following cubes :

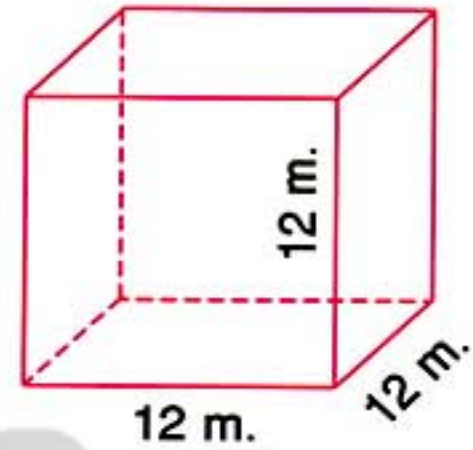
a



b



c



2 A cube of edge length 6 cm.

Find its lateral area and its total area.

(El-Fayoum 2017)

3 A cube of edge length 8 cm. Calculate its lateral area and its total area.

4 If the edge length of a cube is 1.5 cm. Find its total area.

5 Find the total area of a cube whose face area is 49 cm^2

6 If the lateral area of a cube is 36 cm^2 Find its total area.

(Assiut 2012)

7 Find the lateral area of a cube whose total area is 48 m^2

8 The sum of the edge lengths of a cube is 48 cm. Find :

a The edge length of the cube.

b Its lateral area.

c Its total area.

(Beni Suef 2013)

9 The sum of edge lengths of a cube is 84 cm. Find :

a Its lateral area.

b Its total area.

(El-Gharbia 2014)

10 The sum of edge lengths of a cube is 120 cm. Find :

- The lateral area of the cube.
- The total area of the cube.
- The volume of the cube.

(Cairo 2013)

11 The perimeter of one face of a cube is 24 cm. Find :

- The edge length of the cube.
- The lateral area of the cube.
- The total area of the cube.

12 The perimeter of the base of a cube is 28 cm. Calculate its lateral area and total area.

13 The total area of a cube is 384 cm^2 . Find :

- Area of one face of this cube.
- Its edge length.
- Its lateral area.

(El-Dakahlia 2011)

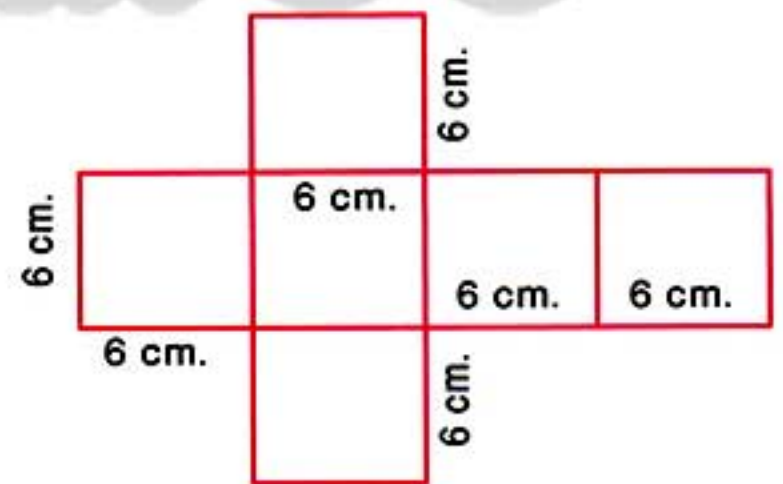
14 If the total area of a cube is 216 m^2 . Find its lateral area and its volume.

15 A cube is of edge length 8 cm. Calculate the ratio between its lateral area and its total area.

(El-Gharbia 2017)

16 When folding the opposite shape :

- The formed solid is
- The lateral area of this solid is
- The total area of this solid is



17 Complete the following table considering the unit length measured by cm. :

Cube	Edge length	Lateral area	Total area
A	8	.....	.....
B	.....	.....	54
C	.....	100	.....

Unit Three

18 Complete :


- a The lateral area of a cube = \times (Luxor 2012)
- b The total area of a cube = \times (Kafr El-Sheikh 2014)
- c The edge length of a cube = 5 cm.
 , then the area of one of its faces =
- d A cube of edge length 6 cm. , then its lateral area = cm^2
 (El-Gharbia 2014)
- e The total area of a cube of edge length 4 cm. = cm^2 (Cairo 2015)
- f The edge length of a cube is 50 mm. , then its total area is cm^2
- g The base area of a cube is 36 cm^2 , then its lateral area is cm^2
- h If the area of one face of a cube = 5 cm^2 , then the total area
 of this cube = cm^2 (Alexandria 2011)
- i The sum of the edge lengths of a cube equals 72 cm. , then the length
 of the edge equals cm.
- j The sum of the edge lengths of a cube = 24 cm. , then the area of one
 face = cm^2 (Assiut 2016)
- k If the perimeter of one face of a cube = 12 cm. ,
 then its total area = cm^2 (El-Menia 2016)
- l The face area of a cube is 4 cm^2 , then its volume = cm^3
 (El-Monofia 2016)
- m The lateral surface area of a cube is 100 cm^2 , then its volume
 equals cm^3 (Cairo 2012)
- n If the volume of a cube is 1000 cm^3 , then its total area = cm^2
 (El-Dakahlia 2015)
- o The ratio between the area of one face of a cube and its lateral area = $\frac{\text{.....}}{\text{.....}}$
- p The ratio between the area of one face of a cube and its total area = $\frac{\text{.....}}{\text{.....}}$
- q The ratio between the lateral area and the total area of a cube = $\frac{\text{.....}}{\text{.....}}$
- r If the ratio between the edge lengths of three cubes is 1 : 2 : 3 ,
 then the ratio between their lateral areas = : :

19 Choose the correct answer from the given ones :

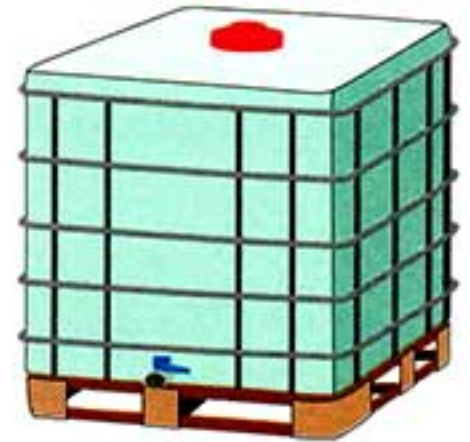
- a The lateral area of the cube = Area of one face \times (South Sinai 2013)
 (a) 2 (b) 4 (c) 6 (d) 8
- b A cube of side length 4 cm. , then its lateral area = cm^2 (Beni Suef 2012)
 (a) 32 (b) 64 (c) 84 (d) 96
- c A cube of edge length 6 cm. , then its total area = cm^2 (Cairo 2017)
 (a) 36 (b) 72 (c) 144 (d) 216
- d If the perimeter of one face of a cube = 4 cm. , then its total area = cm^2 (El-Dakahlia 2011)
 (a) 3 (b) 4 (c) 5 (d) 6
- e The area of base of a cube is 49 cm^2 , then its lateral area equals cm^2 (Alexandria 2014)
 (a) 392 (b) 294 (c) 196 (d) 98
- f A cube of total area 150 cm^2 , then the length of its edge is cm . (Luxor 2015)
 (a) 5 (b) 6 (c) 15 (d) 10
- g If the total area of a cube is 24 cm^2 , then its volume = cm^3 (El-Fayoum 2012)
 (a) 8 (b) 2 (c) 4 (d) 16
- h A cube its lateral area = 36 cm^2 , then its volume = cm^3 (Souhag 2013)
 (a) 27 (b) - 27 (c) - 1 (d) \emptyset
- i A cube, its volume is 1000 cm^3 , then its lateral area = cm^2 (Damietta 2016)
 (a) 600 (b) 500 (c) 400 (d) 200
- j A cube-shaped box , without a lid , has faces.
 (a) 4 (b) 5 (c) 6 (d) 8
- k A cube without a lid of edge length 3 cm. , then its total area =
 (a) 54 (b) 45 (c) 36 (d) 9

Unit Three

- l The area of one face of the cube = its total area. (Kafr EL-Sheikh 2011)
- (a) $\frac{1}{2}$ (b) $\frac{1}{8}$ (c) $\frac{1}{6}$ (d) $\frac{1}{4}$
- m If the edge length of a cube equals the side length of an equilateral triangle whose perimeter is 18 cm. , then the lateral area of this cube = cm²
- (a) 36 (b) 144 (c) 216 (d) 180

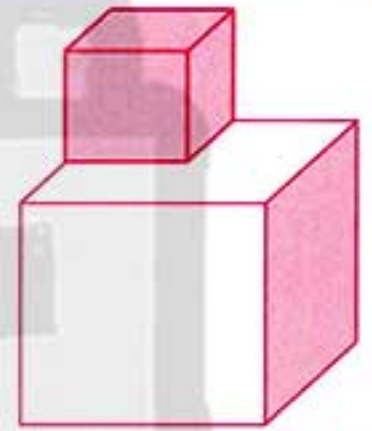
- 20  A container water tank is in the form of a cube whose inner length is 1.5 m. It is wanted to paint it to prevent the rust. The cost price of one square metre is L.E. 15 Calculate the cost of painting.

(Giza 2017)



- 21 In the opposite figure :

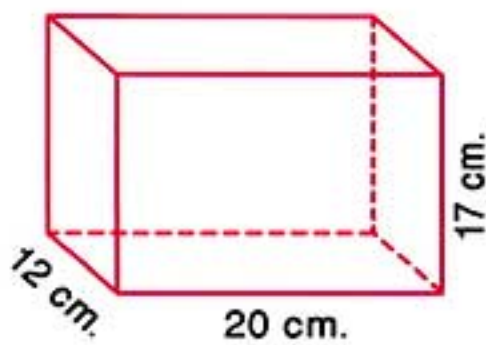
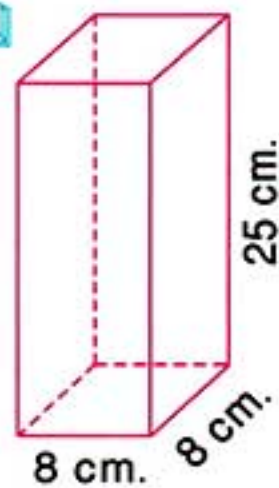
A solid consists of two sticking cubes, the length of the edge of one of them is 2 cm. and that of the other is 1 cm. , then find the total area of the solid.



- 22 A factory has a quantity of carton paper of area 120 m² It is required to make cube-shaped boxes of it , each box is of edge length 30 cm. Find the number of boxes which can be obtained given that 10 % of the area is lost.



The cuboid

- 23 Calculate the lateral area and total area for each of the following cuboids :

a b 

c



- 24** The perimeter of the base of a cuboid = 24 cm. and its height = 10 cm.
Calculate the lateral area. (Giza 2014)
- 25** A cuboid , its length is 6 cm. , its width is 4 cm. and its height is 8 cm.
Find its lateral area and its total area. (Alexandria 2017)
- 26** Calculate the lateral area of a cuboid , its base is a square of side length 6 cm. and its height is 10 cm. (El-Kalyoubia 2015)
- 27** A cuboid of a square base with side length 8 cm. and its height equals 10 cm.
Find :
a Its lateral area. **b** Its total area. (El-Dakahlia 2012)
- 28**  A cuboid-shaped box with a square base whose side length is 9 cm. and its height is 20 cm. Calculate the lateral area and the total area. (El-Fayoum 2012)
- 29** A cuboid whose total area = 132 cm^2 and its lateral area = 112 cm^2
Find the area of its base. (Giza 2016)
- 30** A cuboid whose lateral area is 160 cm^2 and the dimensions of its base are 7 cm. and 3 cm. Find its height. (Ismailia 2014)
- 31** A cuboid with a square base whose perimeter is 20 cm. and its height is 8 cm.
Find :
a The lateral area. **b** The length of its base side.
c The total area. (Ismailia 2012)
- 32** The perimeter of the base of a cuboid = 32 cm. and its height = 10 cm. ,
if the length of the base = 9 cm. Find the lateral area and the total area of the cuboid. (El-Gharbia 2015)
- 33**  A cube is of edge length 10 cm. and a cuboid whose length is 8 cm. ,
its width is 5 cm. , and its height is 17 cm.
Calculate the difference between their lateral areas.

Unit Three

- 34 A tin, shaped as a cuboid without a lid, is 18 cm. long and 7 cm. wide and its height is 12 cm. Calculate its lateral area and its total area.

(Ismailia 2011)

- 35 A box without a lid whose length is 16 cm., its width is 7 cm. and its height is 19 cm. Calculate its lateral area and total area.

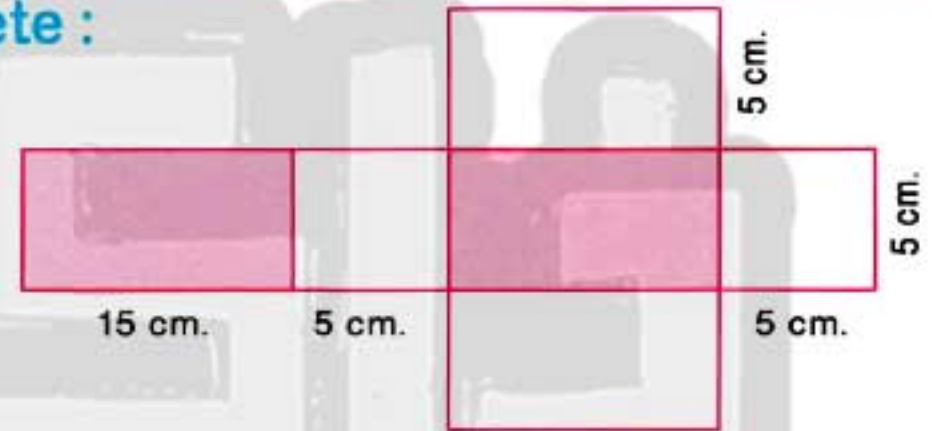
(El-Kalyoubia 2016)

- 36 A cuboid base is a square of side length 32 cm. and its height is $\frac{3}{8}$ the side length of its base. Find its total area.

- 37 The volume of a cuboid is 180 cm^3 and the dimensions of its base are 5 cm. and 1.2 dm. Find its total area.

- 38 When folding the opposite figure, complete :

- a The formed solid is
- b The lateral area of the solid =
- c The total area of the solid =



(Souhag 2013)

- 39 Complete the following table considering the unit length measured by cm. :

Cuboid	Width	Length	Height	Lateral area	Total area
A	6	9.5	8	.....	.....
B	5	.....	4	120	.....
C	.....	7	.....	220	276

- 40 Complete :

- a The lateral area of the cuboid = \times (Souhag 2017)
- b The total area of the cuboid = + (Ismailia 2014)
- c If the perimeter of the base of a cuboid = 20 cm. , and its height = 9 cm. , then its lateral area = cm^2 (El-Dakahlia 2011)
- d A cuboid of length 6 cm. , width 4 cm. and height 10 cm. , then its lateral area = cm^2 (Cairo 2013)

- e A cuboid has a square-shaped base with side length 20 cm. and a height 25 cm. , then its lateral area = cm²
- f If the lateral area of a cuboid is 60 cm² and its base area is 8 cm² , then its total area = cm²
- g A cuboid of length 7 cm. , width 3 cm. and height 8 cm. , then its total area = cm²
- h If the lateral area of a cuboid = 120 cm² and the dimensions for the base are 4 cm. and 6 cm. , then its height = cm. (Alexandria 2012)

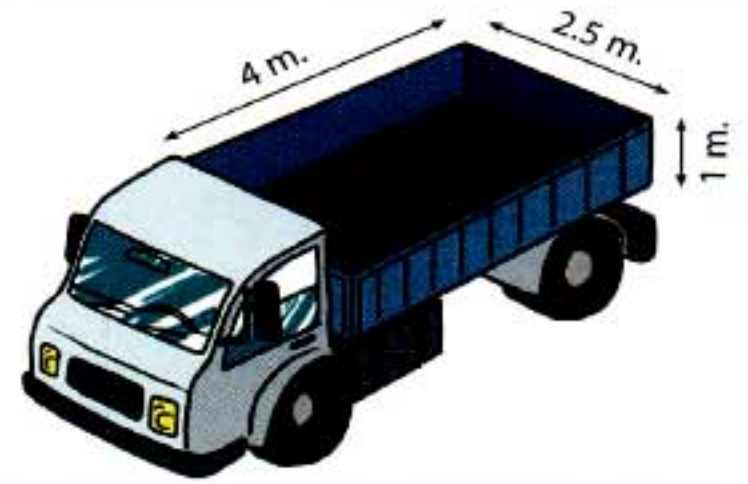
41 Choose the correct answer from the given ones :


- a The lateral area of the cuboid = the perimeter of the base × (Suez 2016)
- (a) height (b) width (c) length (d) volume
- b The lateral area of the cuboid with length is 3 cm. , width is 2 cm. and height is 4 cm. = cm² (El-Beheira 2013)
- (a) 20 (b) 24 (c) 40 (d) 52
- c The lateral area of a cuboid with base in the shape of a square with side length 8 cm. and the height of the cuboid is 5 cm. = cm²
- (a) 40 (b) 80 (c) 160 (d) 240
- d The total area of the cuboid with length is 12 cm. , width is 6 cm. and height is 4 cm. = cm²
- (a) 216 (b) 36 (c) 360 (d) 288
- e The height of the cuboid whose lateral area is 120 cm² and the dimensions of its base are 6 cm. and 4 cm. = cm. (El-Gharbia 2014)
- (a) 5 (b) 6 (c) 12 (d) 2.5
- f If the total area of a cuboid = 32 cm² and its lateral area = 12 cm² , then the area of one of its bases = cm²
- (a) 32 (b) 20 (c) 18 (d) 10
- g The dimensions of a base of a cuboid are 4 cm. and 3 cm. and its lateral area = 140 cm² , then its volume = cm³
- (a) 1680 (b) 120 (c) 168 (d) 60

Unit Three


- 42 A swimming pool whose base is of dimensions 40 m., 10 m. and its height equals 2.5 m. Calculate :
- a Its lateral area. b Its total area. (El-Monofia 2011)

- 43 The cuboid-shaped box of a truck with inner dimensions 4 , 2.5 and 1 metres, as shown in the figure, is painted internally. If each square metre of the box to be painted costs L.E. 8 Calculate the paint cost.





- 44  A truck box is in the form of a cuboid, whose inner dimensions are 5 m. , 2.5 m. and 1.6 m. It is wanted to paint the inner box with paint , the cost price of one square metre is L.E. 12 Calculate the cost of paint.



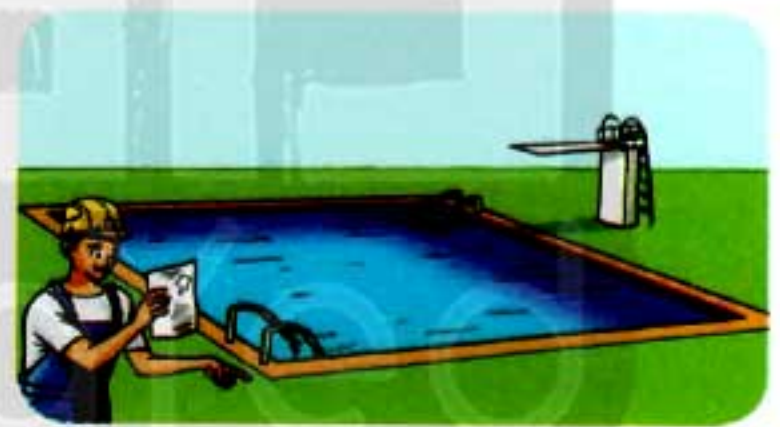
- 45  A truck box for carrying goods is in the form of cuboid whose inner dimensions are 4 m. , 2.5 m. and 1.8 m. It is wanted to cover its sides and ceiling with a sheet iron, the cost price of square metre is L.E. 15 Calculate the cost of required sheet iron.

- 46 A cuboid-shaped box without a lid has a base with inner dimensions 1.6 m. long , 1.5 m. wide and 80 cm. high. We want to cover it from inside with iron sheets that cost L.E. 10 per square metre. Find the cost of the iron sheets needed.

- 47 A water tank is in the form of a cuboid of inner dimensions 3 m. , 2 m. and $1\frac{1}{2}$ m. The required is to paint it internally. If the cost price of each square metre is L.E. 10 , then calculate the cost of painting of all the inner surface of the tank.


- 48  A room whose length is 5 m. , its width is 4 m. , and its height is 3.2 m. It is wanted to paint its lateral walls and ceiling. The cost price of one square metre to be painted is L.E. 8 Calculate the required cost knowing that the room has 2 windows and a door whose areas are 8 m^2
- 49  A room of a squared floor whose length is 4 m. and its height is 3 m. It has a door whose width is 90 cm. , and 2 m. high. It has two rectangular equal windows of length 100 cm. and width 61 cm. Calculate the cost of painting of the walls , given that the cost price of painting one square metre is L.E. 9
- 50 A room has a square floor of side length 5 m. and height 2.8 m. It has a door of width 90 cm. and height 2.20 m. and two windows each of dimensions 1 m. and 60 cm. The walls and ceiling of the room are painted. If the cost of one square metre to be painted is L.E. 10 Find the cost of painting the room.

- 51 The inner dimensions of a swimming pool are 25 , 12 and 2.25 metres. It is necessary to cover its inner floor and sides with square-shaped ceramic tiles of side length 25 cm. How many tiles are needed ?




- 52 The inner dimensions of a swimming pool are 25 m. , 16 m. and 3.5 m. It is necessary to cover its inner floor and sides with square-shaped ceramic tiles of side length 20 cm. How many tiles are needed ?



- 53  A swimming pool whose base is with dimensions 40 m. , 10 m. and its height equals 205 cm. It is needed to be covered by ceramic with square shape of side length = 25 cm. Find :
- a The number of boxes of ceramic is needed if each box contains 25 units of ceramic.

Unit Three

- b The total cost if the price of one square metre of ceramic = 45 pounds and the cost for covering 1 square metre by ceramic = 5 pounds.

54  Youssef used a piece of cardboard in the form of a rectangle , its length is 1.2 m. and its width is 80 cm. to form a cube-shaped box whose edge length is 30 cm. Calculate the remained paper area after forming the box.

55 If we double the dimensions of a cuboid , what is the ratio between the new total area and the initial one ?

56 If the total area of the cuboid is 400 cm^2 . and the side length of its square-shaped base is 10 cm., then find its height.

57 The sum of the lengths of the edges of a cuboid is 136 cm. and the ratio between the dimensions of its base is 3 : 5 , if its height is 1 dm. Find its total area.

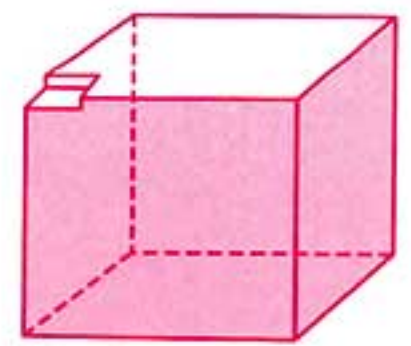
58 A cuboid in which : its length + its width = 16 cm., its width + its height = 14 cm. and its height + its length = 18 cm. Find its lateral area and its volume.

59 The height of a cuboid-shaped water tank is 4 m. and the perimeter of its base is 20 m. and the ratio between its base dimensions is 3 : 7 Find the cost of painting the outer surface of the tank , without its base with special paint that costs L.E. 5 per square metre.



60 The total area of a cube-shaped piece of metal is 384 cm^2 . It is melted and shaped like a cuboid whose base dimensions are 16 cm. and 2 cm. Find the total area of the cuboid.

61 A cube with edge length 12 cm., a part of it is cut to form a cuboid whose side lengths are 3 cm., 2 cm. and 1 cm., find the total area of the remained part of the cube.



Sheet

5

Total mark

25

From lesson 1 unit 1
to lesson 5 unit 1

1 Choose the correct answer :

[a] $(-7)^2 \dots\dots\dots \mathbb{N}$ (\in or \notin or \subset or $\not\subset$)

[b] The additive inverse of $(-3)^2$ is $\dots\dots\dots$ (9 or 3 or -3 or -9)

[c] $(-9)^2 = \dots\dots\dots$ (-81 or -18 or 81 or 18)

[d] If $|-4| = x$, then $x = \dots\dots\dots$ (4 or -4 or 16 or -18)

[e] If $-7 + n = -7$, then $n = \dots\dots\dots$ (1 or 7 or -7 or 0)

5

2 Find the value of each of the following :

[a] $5^4 \times 5^3 = \dots\dots\dots$

[b] $9^9 + 9^7 = \dots\dots\dots$

[c] $8^3 \times 8 \times 8^2 = \dots\dots\dots$

[d] $\frac{(-7)^8}{(-7)^6} = \dots\dots\dots$

6

3 Simplify each of the following :

[a] $\frac{3^5 \times 3^4}{3^7}$

[b] $\frac{6^3 \times 6^5}{6^7 \times 6}$

6

4 Put the suitable relation "> , = or <" :

[a] $-12 \dots\dots\dots (-6)^2$

[b] $(-1)^2 \dots\dots\dots (-1)^3$

[c] $\frac{9^3}{9^3} \dots\dots\dots (-10)^{\text{zero}}$

[d] $|-6| + (-5)^2 \dots\dots\dots 2^5$

6

5 Arrange in a descending order :

$(-2)^5$, $(-4)^0$, $(-3)^4$, $(-1)^{15}$ and 3^2

2

10

هذا العمل خاص بموقع ذاكرولي التعليمي ولا يسمح بتداوله على مواقع أخرى

Sheet

6

Total mark

25

From lesson 1 unit 1
to lesson 6 unit 1

1 Complete in the same pattern :

[a] 2, 6, 10, 14,,

[b] 1, 4, 9,,

[c] $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$,,

[d] 10 000, 1 000, 100,,

[e] -2, 0, 2, 4,,

5

2 Describe the pattern, then complete in the same pattern :

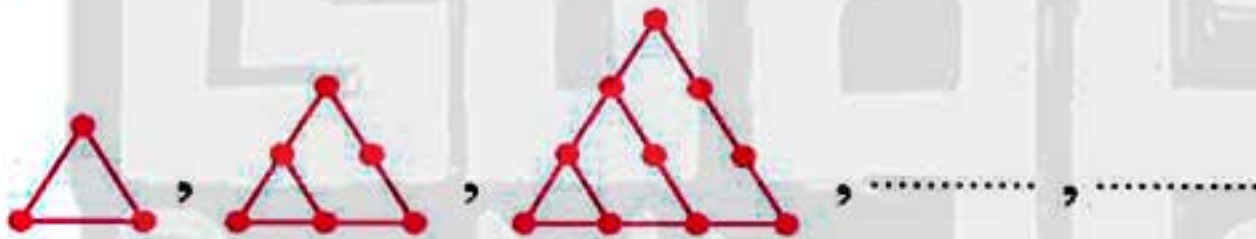
[a] 5, 13, 21, 29,,,

[b] 25, 21, 17, 13,,,

[c] 1, 2, 4, 8, 16,,,

6

3 Look at the pattern of dots, then answer :

[a] Draw the 4th and the 5th shapes.[b] How many dots will be there in the 4th and the 5th shapes ?

5

4 Arrange each of the following numbers in an ascending order :

[a] $(-4)^2$, -5, $|-5|$, 0, 6 and -14

[b] 11, 5^0 , $-|7|$, -11, 0 and 3^3

4

5 Choose the correct answer :

[a] $\{-3, \frac{7}{11}\}$ \mathbb{Z}

(\in or \notin or \subset or $\not\subset$)

[b] If $m \times 7 = 0$, then $m =$

(1 or 0 or 2 or -7)

[c] $8 +$ = -2

(6 or -10 or 10 or -6)

[d] $\mathbb{N} \cup \mathbb{Z}^- =$

(\mathbb{Z} or \mathbb{Z}^+ or $\{0\}$ or \mathbb{N})

[e] $6 - (-9) =$

(-3 or 3 or 15 or -15)

5

11

Sheet

7

Total mark

25

From lesson 1 unit 1
to lesson 1 unit 2

1 Find the solution set of each of the following equations :

[a] $x + 5 = 12$, if the substitution set is : $\{3, 5, 8, 7\}$

[b] $3x - 4 = 8$, if the substitution set is : $\{3, 5, 6\}$

[c] $2x + 1 = x - 3$, if the substitution set is : $\{2, 4, -1, -4\}$

[d] $3(x - 2) = -6$, if the substitution set is : $\{-1, 0, 1\}$

6

2 Find the solution set of each of the following inequalities :

[a] $3x + 5 > 2$, if the substitution set is : $\{-2, -1, 0, 1\}$

[b] $3x - 1 > -2$, if the substitution set is : $\{-2, -1, 0, 1, 2\}$

[c] $5x - 1 > 4$, if the substitution set is : $\{2, 3, 4, 5, 6\}$

[d] $x + 3 < 5$, if the substitution set is : $\{0, 1, 2, 3, 4\}$

6

3 Considering the set of substitution is $A = \{0, 1, 2, 3\}$

Find the solution set of each of the following :

[a] $2x - 7 = -1$

[b] $x + 4 > 5$

3

4 Complete :

[a] The additive inverse of $-4 = \dots\dots\dots$

[b] $|-9| + 3 = \dots\dots\dots$

[c] $1, 2, 4, 8, 16, \dots\dots\dots, \dots\dots\dots, \dots\dots\dots$ (in the same pattern)

[d] $\mathbb{Z}^+ \cap \mathbb{Z}^- = \dots\dots\dots$

[e] The multiplicative neutral element in \mathbb{Z} is $\dots\dots\dots$

5

5 [a] Simplify : $\frac{5^4 \times 3^6}{3^4 \times 5^2}$

[b] Determine the degree of each of the following equations :

(1) $4b - 7 = 8$

(2) $x^3 - 3x^2 = 4$

(3) $x - 2y = 9$

(4) $x^4 + 3x^5 = 19$

5

12

هذا العمل خاص بموقع ذاكرولى التعليمي ولا يسمح بتداوله على مواقع أخرى

Sheet

3

From lesson 1 unit 3
to lesson 3 unit 3

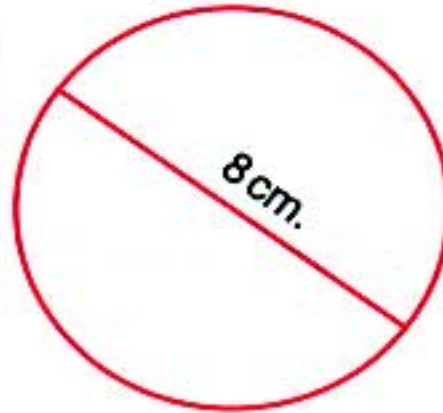
Total mark
25

1 Find the area of each of the following circles (consider $\pi = 3.14$) :

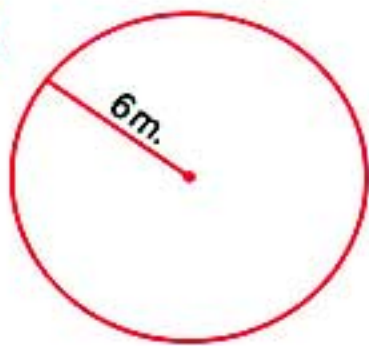
a



b



c



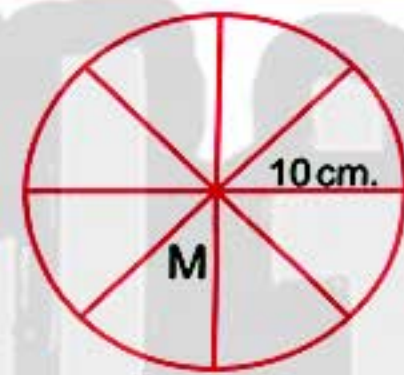
d



2 In the opposite figure :

A circle M of radius 10 cm. is divided into 8 equal circular sectors.

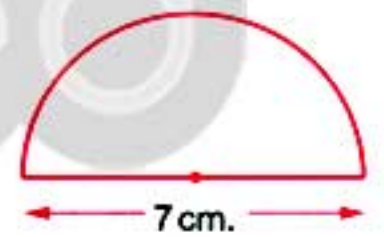
Calculate the area of one sector (consider $\pi = 3.14$)



3 (a) If the length of the diameter of a circle is 14 cm. Calculate :

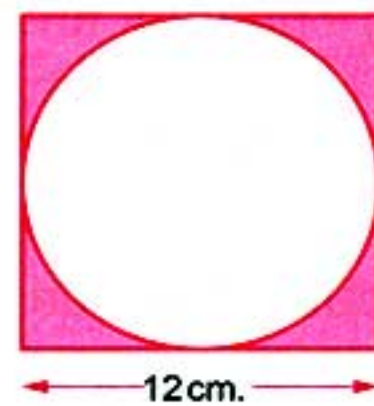
- (1) The circumference of the circle.
- (2) The surface area of the circle. (consider $\pi = \frac{22}{7}$)

(b) Find the area of the opposite figure (consider $\pi = \frac{22}{7}$)



4 In the opposite figure :

Find the area of the shaded part. (consider $\pi = 3.14$)



5 (a) Determine in the coordinates plane the image of the line segment \overline{AB} where A (2 , 3) , B (- 2 , 0) by translation $(x + 3 , y - 2)$

(b) A circle , its circumference is 88 cm.
Calculate its radius length and its surface area. (consider $\pi = \frac{22}{7}$)



Sheet

4

From lesson 1 unit 3
to lesson 4 unit 3

Total mark
25

1 (a) A cube-shaped box is of edge length 5 cm. Find :

- (1) Its lateral area.
(2) Its total area.



(b) A cuboid is with length 7 cm. , width 5 cm. and height 8 cm. Find :

- (1) Its lateral area.
(2) Its total area.

2 (a) If the sum of the edges of a cube is 108 cm.

Find its lateral and total area.



(b) A cuboid is with square base of side length 3 cm. and height 6 cm.

Find its lateral area and total area.

3 (a) The perimeter of the base of a cuboid is 20 cm. and its height is 6 cm.

Calculate the lateral area of the cuboid.



(b) If the lateral area of a cube is 100 cm^2 Find its total area.

4 (a) A cuboid with a square base whose perimeter is 20 cm.

and its height is 8 cm. Find :

- (1) The lateral area.
(2) The length of its base side.
(3) The total area.



(b) Find the area for the circle with diameter length 14 cm. (consider $\pi = \frac{22}{7}$)

5 (a) A cuboid whose total area = 132 cm^2 and its lateral area = 112 cm^2

Find the area of its base.



(b) A cuboid whose lateral area 140 cm^2 and the dimensions of its base are

6 cm. and 4 cm. Find its height.

EXERCISE 5

Repeated multiplication

1 Find the value of each of the following:

a) $2^5 = \dots\dots\dots$

b) $3^3 = \dots\dots\dots$

c) $(-4)^3 = \dots\dots\dots$

d) $(-9)^2 = \dots\dots\dots$

e) $(-8)^{\text{zero}} = \dots\dots\dots$

f) $(-1)^{35} = \dots\dots\dots$

g) $(-1)^{24} = \dots\dots\dots$

h) 5 cubed = $\dots\dots\dots$

i) 7 squared = $\dots\dots\dots$

j) 2 to the third power = $\dots\dots\dots$

2 Choose the correct answer:

a) $(-7)^3 = \dots\dots\dots$ (-343 or 343 or -21 or 21)

b) $(-9)^2 = \dots\dots\dots$ (-18 or 18 or 81 or -81)

c) $(-35)^{\text{zero}} = \dots\dots\dots$ (35 or 15 or 1 or -35)

d) $(-2)^5 = \dots\dots\dots$ (-10 or 10 or -25 or -32)

e) $(-2)^4 = \dots\dots\dots$ (8 or -8 or 16 or -16)

f) $(-1)^3 + 1^3 = \dots\dots\dots$ (-3 or -2 or -1 or zero)

g) $(-8)^{\text{zero}} + (8)^{\text{zero}} = \dots\dots\dots$ (-1 or 1 or 2 or zero)

h) $(-2)^4 < \dots\dots\dots$ ($(-1)^8$ or $(-2)^5$ or 3^3 or $-(3)^5$)

i) $(-2)^2 \dots\dots\dots \mathbb{Z}$ (\in or \notin or \subset or \subsetneq)

j) The additive inverse of $(-1)^3$ is $\dots\dots\dots$ (1 or -1 or 3 or -3)

k) $2^6 \times 2^2 \div 2^7 = \dots\dots\dots$ (2^8 or 2^{12} or 2^5 or 2)

l) $4^3 - 4^2 = \dots\dots\dots$ (4 or 4^5 or 4^6 or 48)

m) $(-1)^{104} + (-1)^{103} = \dots\dots\dots$ (zero or -1 or 1 or 2)

n) $(-5)^{\text{zero}} \times (-3)^2 = \dots\dots\dots$ (3 or 4 or 5 or 9)

o) If $2^5 \div 2^a = 3^0$, then $a = \dots\dots\dots$ (4 or 5 or -5 or 0)

p) If $x = 1$, $y = -2$, then the negative number in the following is $\dots\dots\dots$

($x + y^2$ or $x^2 - y$ or $x^2 + y$ or $x^2 + y^2$)

3 Find the value of each of the following:

a) $x^3 \times x^2 \times x$

b) $5^2 \times 2^3$

c) $(-4)^3 \div (-2)^4$

d) $(-6)^{12} \div 6^{10}$

e) $|(-3)^3| \div 27$

f) $3 \times (-2)^5$

g) $(-7)^2$

h) $(-5)^2 \times 2^2$

i) $(-2)^4 + (-3)^3$

j) $(-1)^{100} + (-1)$

4 Complete each of the following:

a) $\frac{3^5 \times 3^2}{3^3} = \frac{3^{\dots}}{3^{\dots}} = 3^{\dots} = \dots$

b) $\frac{2^7 \times 2^8}{2^8 \times 2^5} = \frac{2^{\dots}}{2^{\dots}} = 2^{\dots} = \dots$

c) $\frac{(-5)^5 \times (-5)^2}{(-5)^3 \times (-5)} = \frac{(-5)^{\dots}}{(-5)^{\dots}} = (-5)^{\dots} = \dots$

d) $\frac{a \times a^5 \times a^6}{a^2 \times a^8} = \frac{a^{\dots}}{a^{\dots}} = a^{\dots} \quad (a \neq 0)$

5 Find the value of each of the following:

a) $\frac{(3)^4 \times (3)^7}{(3)^5 \times (3)^3}$

b) $\frac{2^6 \times 2^5}{2^3 \times 2}$

c) $\frac{(-2)^6 \times 2^4}{2^9}$

d) $\frac{(-3)^3 \times (-3)^4}{(-3)^5}$

e) $\frac{(-8)^3 \times 8^4}{(-8)^7}$

f) $\frac{9^6 \times (-9)^3}{(-9)^5 \times 9^2}$

g) $\frac{(-3)^6}{(-3)^3} + \frac{(-4)^5}{(-4)^3}$

h) $\frac{(-8)^5}{(8)^3} \times (-7)^{\text{zero}}$

i) $\frac{(-9)^5}{(9)^4} \times 9^2$

6 Put the suitable sign (< , = or >) in each :

a) 4^2 8

b) $(-3)^4$ $(-3)^5$

c) 2^4 4^2

d) $(-6)^2$ -12

e) $(-27)^{\text{zero}}$ 1

f) $(-4)^3$ $(-2)^6$

g) $(9)^2$ $(-3)^4$

h) $\frac{1}{7^5} \times 7^5$ 1

i) $2^3 + 2^2$ $2^2 \times 2^3$

j) $(-2)^4 + (-3)^2$ 25

7 Arrange the following numbers:

- a) 3^2 , $(-1)^3$ and $(25)^{\text{zero}}$ (ascendingly)
 b) $(-2)^5$, $(-3)^2$, $(-4)^0$, $(-1)^{15}$ and $(-3)^3$ (ascendingly)
 c) $(-2)^3$, $(-3)^2$, $(-1)^7$ and $(-5)^2$ (descendingly)
 d) 10^2 , $(-1)^5$, 100^2 , $(-10)^3$ and 100000 (descendingly)

8 Use the distributive property to find the value of:

- a) $(18)^2 + 18 \times 12$ b) $112 \times 17 + 112 \times (-17)$ c) $(24)^2 + 24 \times 77 - 24$

9 If $a = -2$, $b = -1$ and $c = 3$, find the value of:

- a) $a^2 + b^2$ b) $(a + b)^3$

10 Simplify each of the following to the simplest form:

- a) $\frac{x^9}{x^4 \times x^5}$, where $(x \neq 0)$ b) $\frac{x \times x^2 \times x^8}{x^3 \times x^7}$, where $(x \neq 0)$
 c) $\frac{x^5 \times y^4}{y^4 \times x^4}$, where $(x \neq 0, y \neq 0)$ d) $\frac{a^{13}}{a^8 \times a^3}$, where $(a \neq 0)$

Cumulative Exercise

11 Use the distributive property to calculate the value of each of the following:

- a) $15^2 + 15 \times 25$ b) $44 \times 24 - (24)^2$
 c) $(18)^2 + 18 \times 83 - 18$ d) $(-4)^3 \times 5 - (-4)^3 \times 2$



THINK AND EXPLORE

12 If $a = 3^2$, $b = 2^3$, find the value of $(a - b)^{10}$.

EXERCISE 6






Numerical patterns

1 Complete in the same pattern:

- a) 1, 3, 5, 7, , , , ,
 b) 1, 4, 7, 10, , , , ,
 c) -2, zero, 2, 4, , , , ,
 d) 16, 12, 8, 4, , , , ,
 e) -20, -18, -16, , , , ,
 f) 7, 3, -1, , , , ,
 g) 243, 81, 27, , , , ,
 h) $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{12}$, , , , ,

(Behera 2017)

2 Complete in the same pattern by writing three consecutive numbers:

- a) 50, 46, 42, 38, , ,
 b) -15, -12, -9, , ,
 c) 3, 9, 27, 81, , ,
 d)  6, 14, 22, 30, 38, , ,
 e)  $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, , ,
 f)  2, 3, 5, 8, 13, , ,
 g)  1, 4, 9, 16, 25, , ,
 h) 0, 1, 8, 27, 64, , ,
 i)  -4, 0, 4, , ,






(Cairo 2016)








3 Complete each of the following patterns:

- a) $1\frac{1}{4}$, 1, $\frac{3}{4}$, , ,
 b) 12, 18, 24, , ,
 c) 4, 8, 12, 16, , ,
 d) 3, 5, 7, 9, 11, , ,
 e) 1, 3, 6, 10, 15, , ,
 f) -35, -30, -25, , ,

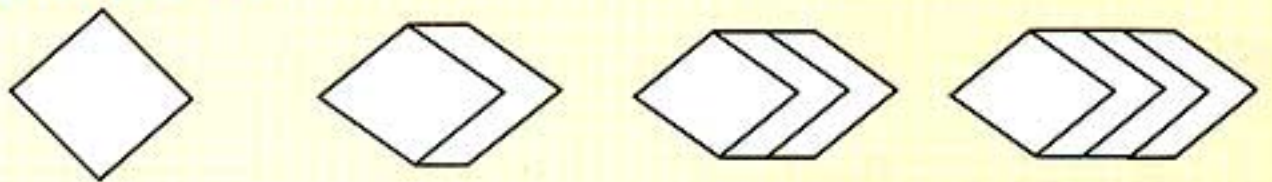
4 Discover the rule of the numerical patterns, then write the missing numbers:

- a)  0.5 , 1 , , 2 , 2.5 , ,
- b)  128 , 64 , , 16 , 8 , ,
- c)  7 , , 15 , 19 , 23 , ,
- d)  , 15 , 12 , 9 , ,
- e) , , 35 , 29 , 23 ,
- f)  4 , 7 , , 13 , 16 , ,

5 Complete the following table:

	The numerical pattern	Description of the pattern
a)	 75 , 70 , 65 , 60	.....
b)	36 , 32 , 28 , ,	Each number is less than its predecessor by 4.
c)	 1 , 10 , 100 , 1000	.....
d)	4 , 8 , 16 , ,	Each number is twice its predecessor.
e)	 3 , 7 , 11 , 15 , 19	.....
f)	4 , , , ,	Each number is more than its predecessor by 5.
g)	 $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1 , $\frac{5}{4}$	.....
h)	 3 , 9 , 27 , 81 , .....	.....
i)	34 , , , ,	Each number is less than its predecessor by 3.

6  Write the number of line segments below each shape, then write the numerical pattern and its description:

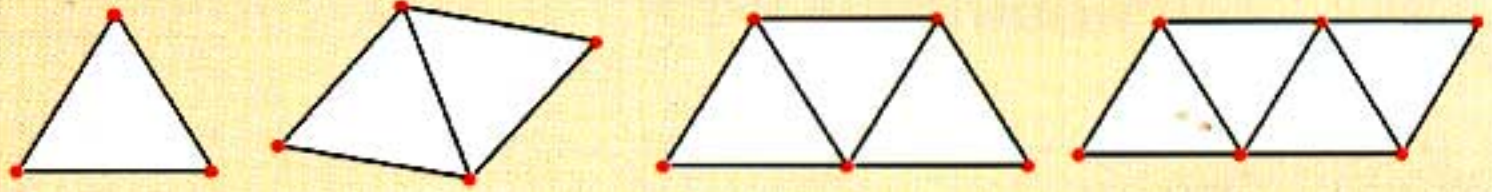


The number of line segments:

The numerical pattern:

Description of the pattern:

- 7 Write the number of triangles below each shape, then write the numerical pattern and its description:



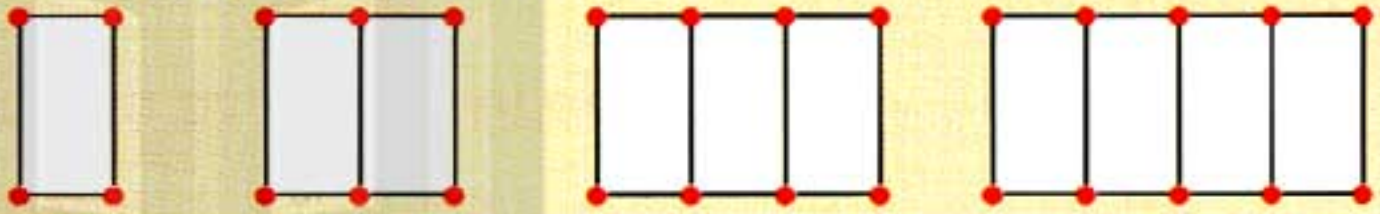
The number of triangles:

The numerical pattern:

Description of the pattern:

Using the number of line segments, write another pattern and describe it.

- 8 Deduce the rule of the pattern that expresses each of the following designs, then write the numerical pattern:

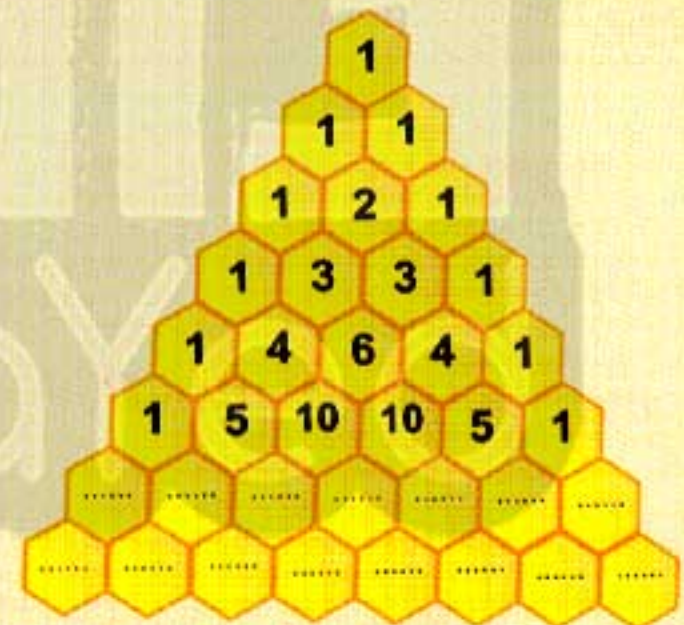


The number of line segments:

The numerical pattern:

The rule of the numerical pattern:

- 9 Copy the opposite Pascal's triangle in your answer sheet and complete the next two rows:



- 10 An Egyptian agricultural company reclaims 6 feddans per day making them prepared and ready for agriculture:

How many days does the company need to reclaim 54 feddans?

Write the numerical pattern which expresses this and describe it.

- 11 Hamada decided to lose weight at the rate of 5 kg monthly. If he is 85 kg heavy right now, how many months does he need to reach 55 kg?

Write the numerical pattern which expresses this and describe it.

EXERCISE

1

The equations and the inequalities of the first degree

1 Complete the following:

- a) $3x + 1 = 16$ is an equation of the degree.
- b) The solution set of $2x - 1 = -1$ is, if the substitution set is $\{0, 1, 2, 3\}$.
- c) The equation is a mathematical sentence that includes relation between its two sides.
- d) The equation $x^2 - 3 = 6$ is of the degree. (Giza 2017)
- e) The solution set of the equation $2x - 1 = 15$, where $x \in \mathbb{Z}^-$ is (Giza 2019)

2 Choose the correct answer:

- a) If $2x = 6$, then $4x =$ (5 or 10 or 12) (Cairo 2019)
- b) All the following numbers satisfy the inequality: $x > -3$ except (0 or -1 or -2 or -4) (Kafr El-Sheikh 2017)
- c) The greatest integer that satisfies the inequality: $x > -3$ is (0 or -1 or -2 or -3) (Kafr El-Sheikh 2016)
- d) $x^3 - 4 = 5$ is an equation of the degree. (first or second or third or fourth) (Giza 2016)
- e) $x^2 + 3 = 4$ is an equation of the degree. (first or second or third or fourth) (Alexandria 2019)
- f) If $x - 1 = 2$, then $x =$ where $x \in \mathbb{N}$. (-1 or -3 or 1 or 3) (Cairo 2018)
- g) The greatest integer that satisfies $x < 6$ is (8 or 6 or 5 or 3)
- h) Which of the following represents an equation? ($x - 17$ or $22 - 7$ or $x > -11$ or $2x + 3 = 7$)

3 Determine the degree of each of the following:

- | | | |
|---------------------|--------------------|----------------------------------|
| a) $x - 7 = 1$ | b) $x^2 + 3 = 8$ | c) $2x^2 + 1 = 5$ |
| d) $2x^2 - 2 = 14$ | e) $3x^3 + 1 = 9$ | f) $x^4 + x^2 + 1 = \text{zero}$ |
| g) $3y^2 + 1 = y^3$ | h) $x - 2y = 5$ | i) $x^2 + x < 1$ |
| j) $x + 3 > 2$ | k) $3a^2 + 1 < 10$ | l) $x^3 - 4x^2 = \text{zero}$ |

4 Find the solution set of each of the following equations in \mathbb{Z} :

- a) $x + 3 = 7$, if the substitution set is $\{2, 3, 4, 5, 6\}$
 b) $x + 5 = 12$, if the substitution set is $\{3, 5, 7, 8\}$
 c) $x - 3 = 5$, if the substitution set is $\{6, 7, 8, 9\}$
 d) $x - 3 = -3$, if the substitution set is $\{-1, 0, 1, 2\}$
 e) $4x = 20$, if the substitution set is $\{3, 4, 5, 6, 7\}$
 f) $3x - 2 = 7$, if the substitution set is $\{-1, 0, 1, 2, 3\}$
 g) $2x + 4 = 14$, if the substitution set is $\{-2, 2, 3, 5\}$
 h) $3 + 2y = 13$, if the substitution set is $\{-5, -1, 0, 1, 5\}$
 i) $-2 + 3b = 7$, if the substitution set is $\{5, 1, 2\}$
 j) $4x - 3 = 9$, if the substitution set is $\{2, 3, 4, 6\}$

5 Find the solution set of each of the following inequalities in \mathbb{Z} :

- a) $x + 3 < 5$, if the substitution set is $\{4, 3, 2, 1, 0\}$
 b) $5 + x > 10$, if the substitution set is $\{7, 6, 5, 4\}$
 c) $x - 2 > -1$, if the substitution set is $\{0, 1, 2, 3\}$
 d) $x - 1 < 2$, if the substitution set is $\{-1, 0, 1, 2, 3\}$
 e) $4x - 3 \leq 5$, if the substitution set is $\{3, 2, 1, 0, -1\}$
 f) $3x - 1 > -2$, if the substitution set is $\{-2, -1, 0, 1, 2\}$
 g) $-x + 1 < 4$, if the substitution set is $\{-3, -2, 0, 2, 3\}$
 h) $3x + 4 > 1$, if the substitution set is $\{-3, -2, -1, 0, 1\}$
 i) $2x + 1 < -3$, if the substitution set is $\{-3, -4, -5, -6\}$
 j) $2x + 5 > 2$, if the substitution set is $\{-3, -2, -1, 0, 1\}$

6 Given that: the substitution set $M = \{-1, -2, 0, 2\}$:


- a) Find the solution set of the equation $2x + 1 = 5$
 b) Find the solution set of the inequality $x - 3 < -1$

7 If the substitution set is $\{3, 6, 9, 12, 15\}$, find the solution set of the following:

- a) $2x + 1 = 13$ b) $12 + 5x = 27$
 c) $x + 2 = 24$ d) $2(x - 1) = 16$

8 a) Find the **solution set** of the following equation:
 $5x - 3 = |-12|$, where the substitution set is $\{2, 3, 4, 5, 6\}$.

b) Find the **solution set** of the following inequality:
 $0 \leq x \leq |-2|$, where the substitution set is $\{-3, -2, -1, 0, 1\}$.

c)  Find the **solution set** of the following equation:
 $2(x - 3) = x + 1$, where the substitution set is $\{4, 5, 6, 7\}$.

d) Consider that the substitution set is $M = \{1, 2, 3\}$.

Find the **solution set** of the equation $3x - 1 = 11$

Cumulative Exercise

9 Express **symbolically** each of the following:

a) x is greater than 2

b) x is less than or equal to -4

c) x is greater than or equal to 3

d) x is less than or equal to 7 and greater than 1

e) x is greater than or equal to -6 and less than or equal to 2

10 Find the **solution set** of each of the following:

a) $|x| + 15 = 17$, if the substitution set is $\{-3, -2, -1, 0, 2\}$.



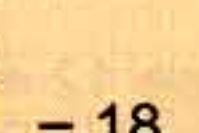
b) $\frac{1}{2}|x| + 2 = 4$, if the substitution set is $\{0, -2, -4, 4, 6, 8\}$.

c) $-1 \leq 3x + 2 \leq 8$, if the substitution set is $\{-2, -1, 0, 1, 2, 3\}$.

d) $-3 \leq x < 2$, if the substitution set is $\{1, 2, 3, -1, -2\}$.

Think and Explore


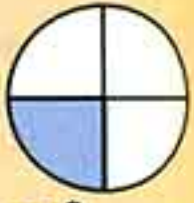
11 a) If    + 2 = 20 , find the value of  using the set of digits $\{5, 6, 8, 3\}$.

b) If  +  = 18 , and    = 18,

then  =


EXERCISE 3 The area of the circle

1 Complete:

- a) The surface area of the circle =
- b) A circle of radius 7 cm, its surface area =
- c) The length of the radius of the circle whose area is 616 cm^2 ($\pi \approx \frac{22}{7}$) = cm.
- d) A circle whose radius is 14 cm, then half of its surface area
= cm^2 ($\pi \approx \frac{22}{7}$) (Ismailia 2017)
- e)  A circle, whose diameter length is 14 cm, then its surface area
= cm^2 . ($\pi \approx \frac{22}{7}$) (South Sinai 2015)
- f) The area of the sector which represents $\frac{1}{4}$ of the surface of a circle
whose radius is 7 cm = cm^2 . ($\pi \approx \frac{22}{7}$) 
- g) The area of the circle whose circumference is $20\pi \text{ cm}$ = cm^2 .
- h) The area of a circle with radius 1 cm = cm^2 .

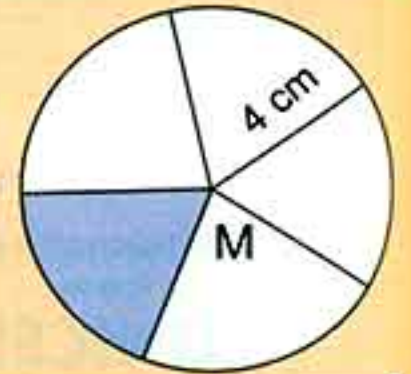
2 Choose the correct answer:

- a) The area of the surface of a circle = (πr or πr^2 or $2\pi r$ or $2\pi r^2$)
- b) The area of the circular sector that represents $\frac{1}{2}$ the surface of a circle =
($\frac{1}{2}\pi r^2$ or $\frac{1}{2}\pi r$ or πr or πr^2)
- c) The surface area of a circle with diameter length 8 cm = $\pi \text{ cm}^2$.
(4 or 8 or 16 or 64)
- d) $\frac{1}{2}$ the diameter of a circle = (2 r or r^2 or $2r^2$ or r)
- e) The circumference of a circle = ($2\pi r^2$ or $2\pi r$ or πr or $\frac{1}{2}\pi r^2$)

- 3  The circle, whose diameter is 12 cm, calculate its surface area where ($\pi \approx \frac{22}{7}$).

4 In the opposite figure:

M is a circle of radius length 4 cm, is divided into five equal circular sectors. Calculate the surface area of each sector where ($\pi \approx 3.14$).




5 If the surface area of a circle is 314 cm^2 , calculate its circumference ($\pi \approx 3.14$).

6 If the surface area of a circle is 154 cm^2 , calculate its circumference ($\pi \approx \frac{22}{7}$).

7 If the circumference of a circle is 88 cm , calculate its radius length and its surface area given that ($\pi \approx \frac{22}{7}$). (Cairo 2019)

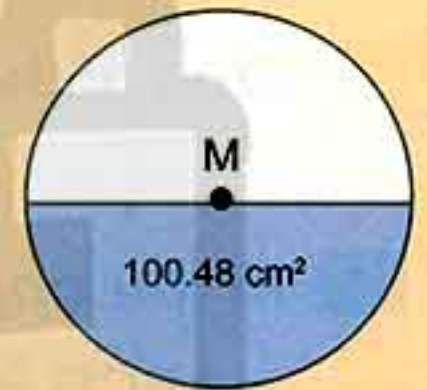
8 If the circumference of a circle is 31.4 cm , calculate its surface area ($\pi \approx 3.14$).

9  If the circumference of a circle is 62.8 cm , calculate its area ($\pi \approx 3.14$).

10  If the circumference of a circle is 44 cm , calculate its radius length and its area. ($\pi \approx \frac{22}{7}$)

11 **In the opposite figure:**

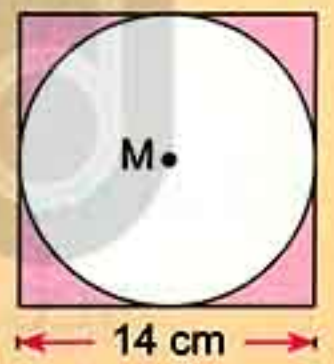
M is a circle if half of its surface area is 100.48 cm^2 , then calculate its circumference, where ($\pi \approx 3.14$).



12 **In the opposite figure:**

M is a circle drawn inside a square of side length 14 cm , where the circle touches its sides.

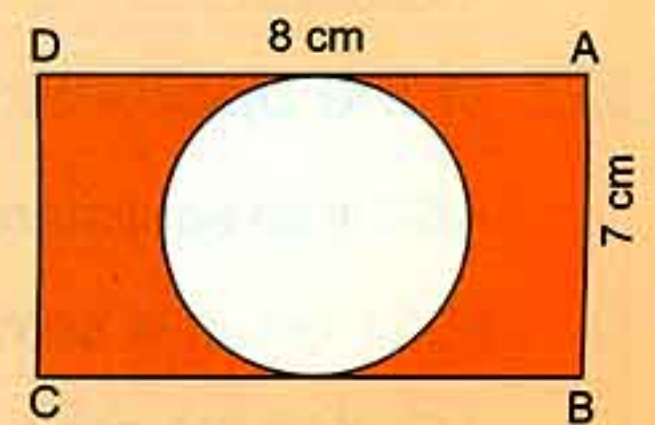
Calculate the area of the shaded part ($\pi \approx \frac{22}{7}$). (Kaf El Sheikh 2017)



13 **In the opposite figure:**

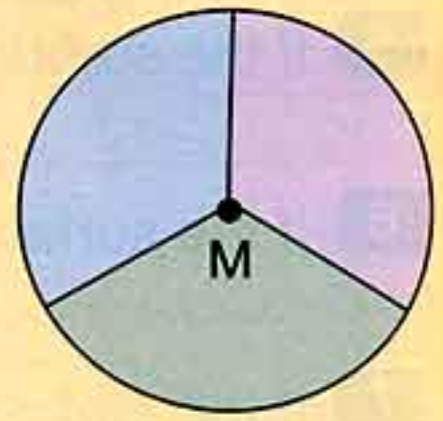
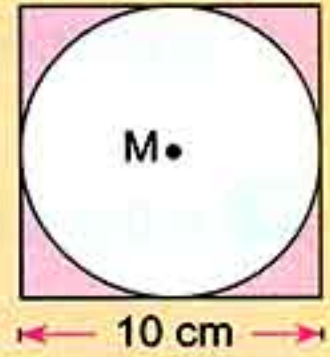
ABCD is a rectangle whose length is 8 cm and width is 7 cm and a circle is drawn touching the sides \overline{AD} , \overline{BC} . Calculate the area of the shaded part

($\pi \approx \frac{22}{7}$). (Giza 2019)

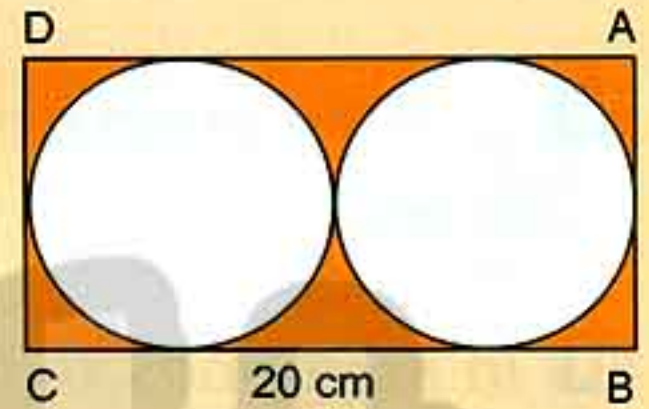


14 *In the opposite figure:*

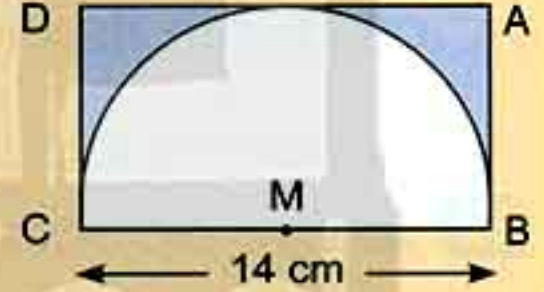
The circle M is divided into three equal circular sectors: if the surface area of one sector is 37.68 cm^2 , then find its radius length ($\pi \approx 3.14$).

**15** *M is a circle drawn inside a square of side length 10 cm. Find the area of the shaded part ($\pi \approx 3.14$).***16** *In the opposite figure:*

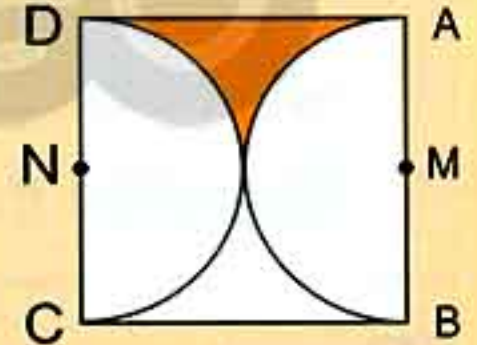
If ABCD is a rectangle whose length is 20 cm and width equals half its length, calculate the area of the shaded part ($\pi \approx 3.14$ or $\frac{22}{7}$).

**17** *In the opposite figure:*

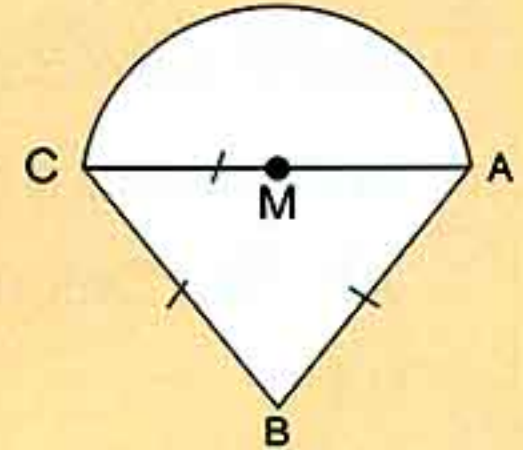
If ABCD is a rectangle whose length is 14 cm, calculate the area of the shaded part ($\pi \approx \frac{22}{7}$).

**18** *In the opposite figure:*

ABCD is a square of side length 7 cm, calculate the area of the shaded part ($\pi \approx \frac{22}{7}$).

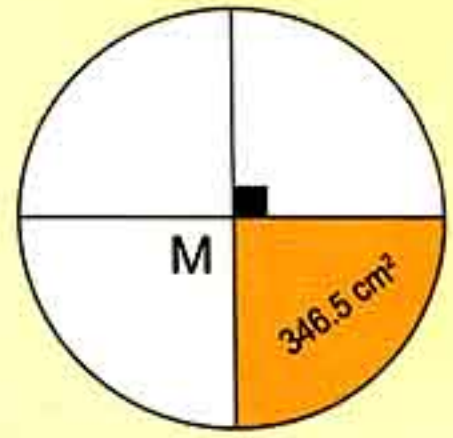
**19** *In the opposite figure:*

ABC is an equilateral triangle, which has a perimeter of 21 cm. If a semicircle of centre M is drawn on \overline{AC} , find the area of the semicircle ($\pi \approx \frac{22}{7}$).



20 In the opposite figure:

A circle M is divided into four equal circular sectors. If the surface area of each sector is 346.5 cm^2 . Calculate:



- The length of the radius of the circle ($\pi \approx \frac{22}{7}$).
- The circumference of the circle.

21 A circular birthday torte of diameter length 25 cm is divided into eight equal circular sectors. Then find the surface area of each sector approximating the result to the nearest integer ($\pi \approx 3.14$).

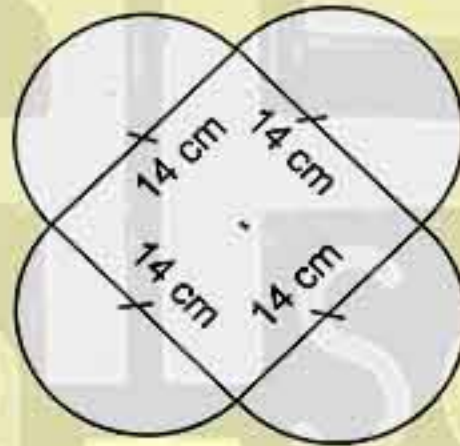


22 Find the area of the following shapes ($\pi \approx \frac{22}{7}$).

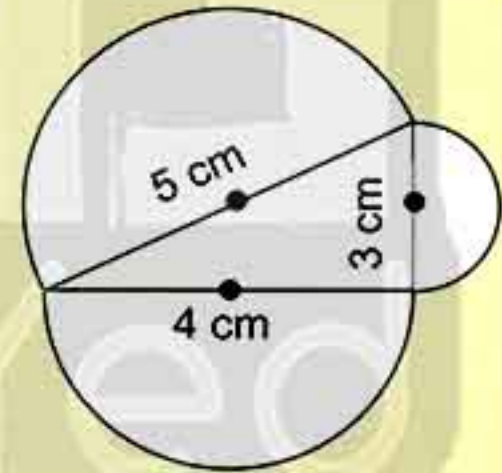
a)



b)

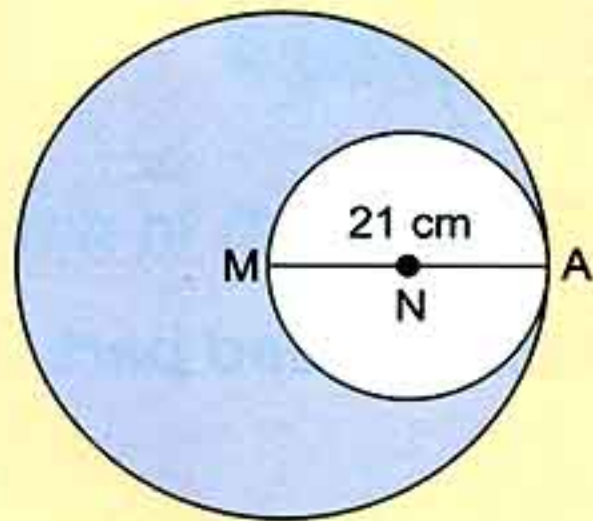


c)

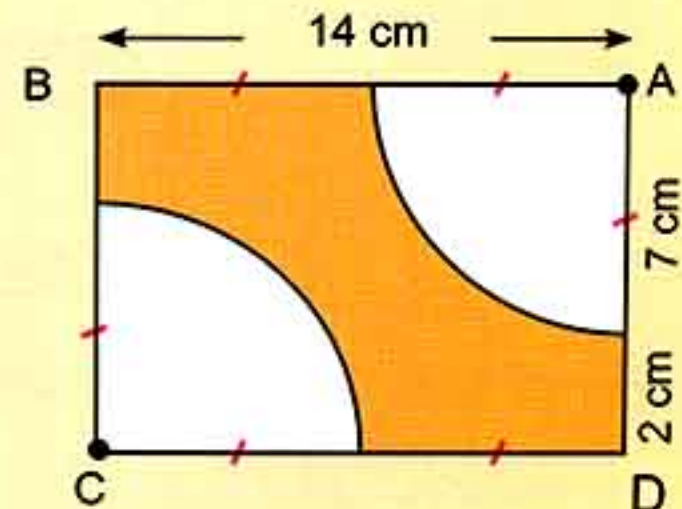


23 Find the area of the shaded part in each shape of the following:

a)



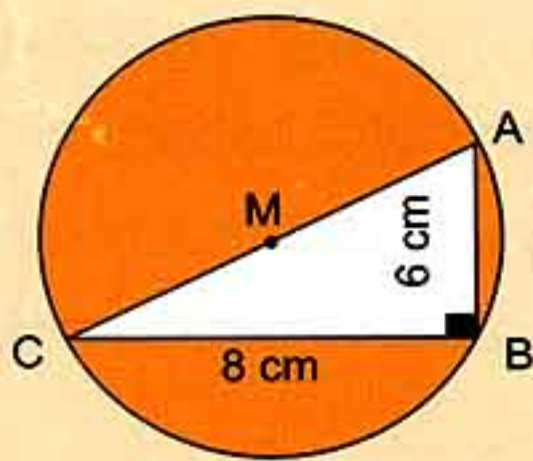
b)



torte

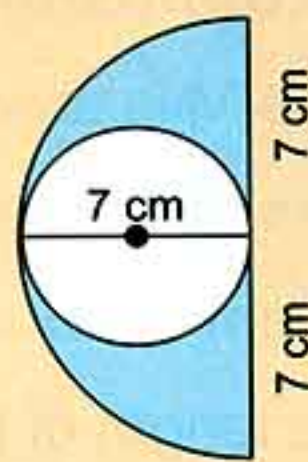
تورته

c)



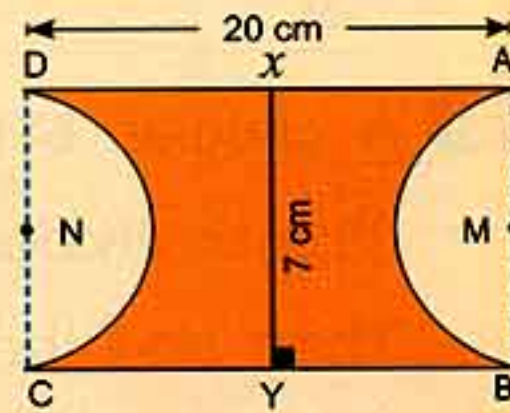
where the diameter = 10 cm

d)



24 In the opposite figure:

Find the area of the shaded part where M and N are two half circles, AD = 20 cm and XY = 7 cm ($\pi \approx \frac{22}{7}$).



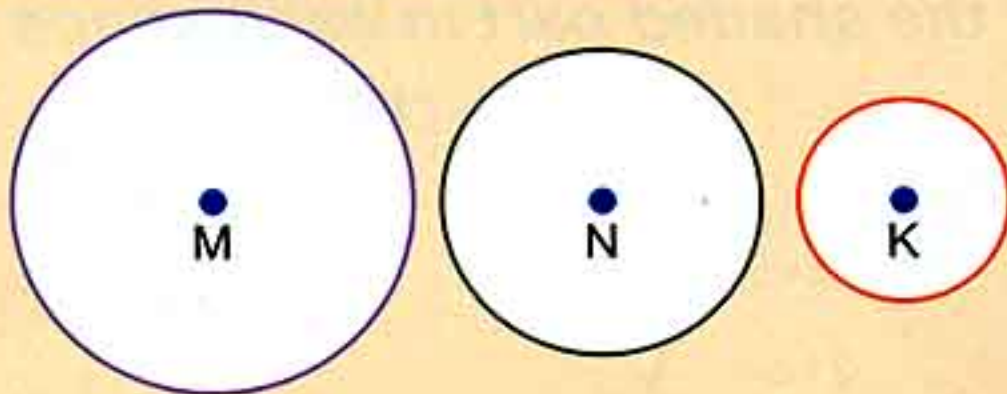
25 A table, its surface in the form of a circle with diameter 1.5 m, we want to cover its surface by a sheet of glass. Calculate the cost price if the square metre of this glass costs L.E. 60.

($\pi \approx \frac{22}{7}$ or 3.14)

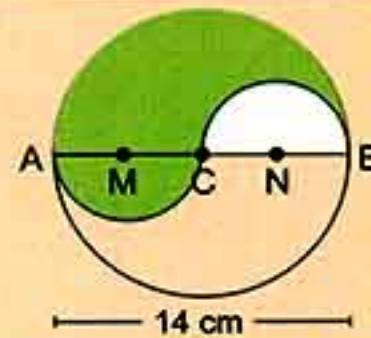


26 A carpet in the shape of a circle with diameter length 200 cm, calculate the price of the carpet given that the price of each square metre is L.E. 50. ($\pi \approx 3.14$)

27 If the ratio between the circumferences of three circles is 1: 2: 3, find the ratio between the areas of these circles.



28 Find the perimeter and the area of the shaded part.



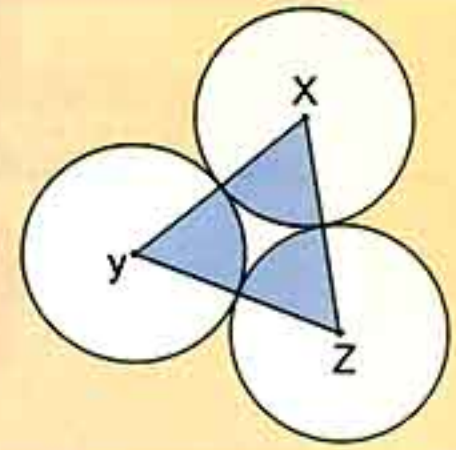
carpet

سجادة | table

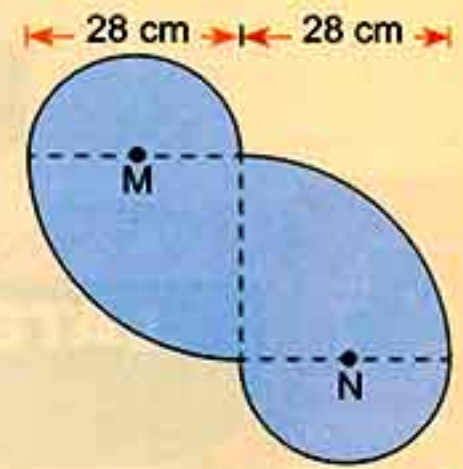
ملصقة | sheet of glass

لوحة من زجاج

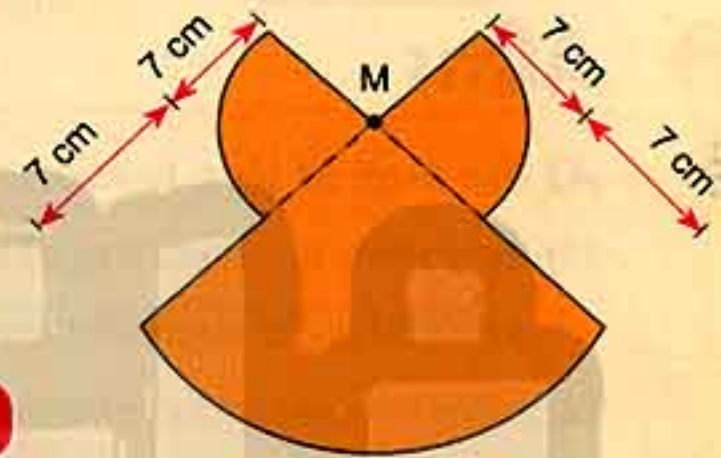
- 29 The opposite figure represents three congruent circles, the radius of each is 10 cm. If $\frac{1}{6}$ of each circle is shaded, find the total area of the shaded part where $\pi \approx 3.14$.



- 30 The opposite figure represents two halves of a circle and two quarters of another circle. Find the area and the perimeter of the figure. ($\pi \approx \frac{22}{7}$)



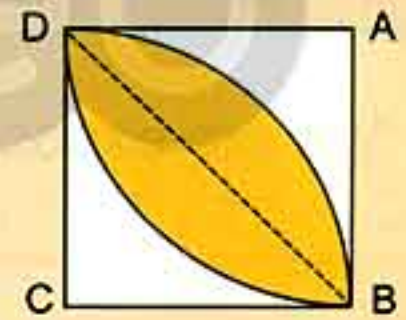
- 31 The opposite figure represents three quarters of different circle. Find the area of the shaded figure. ($\pi \approx \frac{22}{7}$)



Cumulative Exercise

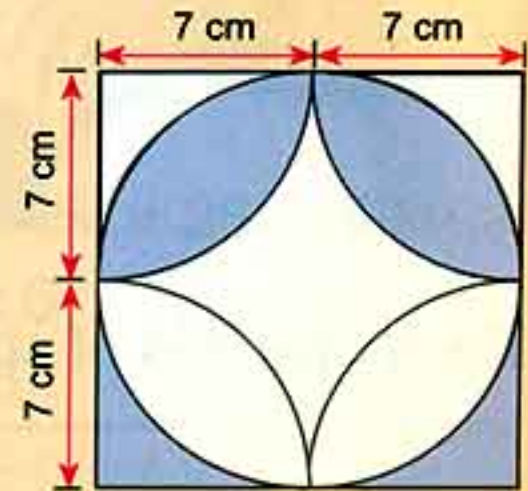
- 32 A circle whose area equals the area of a rhombus whose diagonal lengths are 44 cm and 28 cm. Find the length of the radius of the circle and its circumference. ($\pi \approx \frac{22}{7}$)

- 33 In the opposite figure: ABCD is a square of side length 7 cm, find the perimeter and the area of the shaded part.



Think and Explore

- 34 Find the area of the shaded part: where ($\pi \approx \frac{22}{7}$)



congruent متطابقة

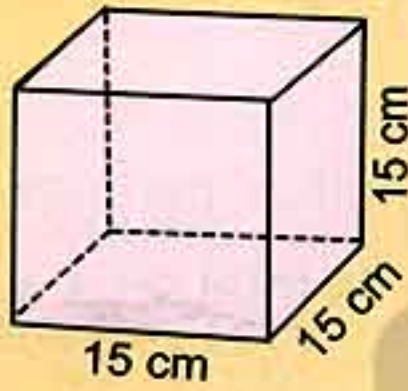
EXERCISE 4

Lateral surface area and total surface area of a cube and a cuboid

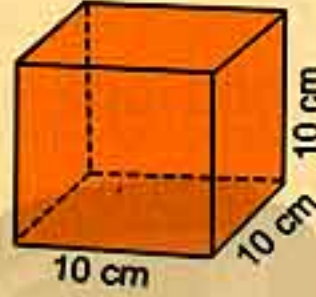
First The cube:

1 Calculate the lateral and total area of each of the following cubes:

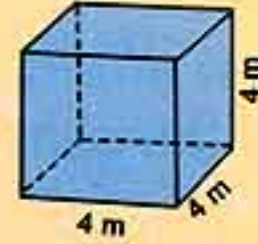
a)



b)





c)





2 Complete each of the following:

- a) The lateral area of a cube of edge length 8 cm = cm^2 .
- b) The lateral area of a cube of edge length 6 cm = cm^2 .
- c) If the edge length of a cube is 4 cm, then its total area = cm^2 .
- d) If the sum of edge lengths of a cube is 84 cm, then its total area = cm^2 .
- e) If the area of base of a cube = 49 cm^2 , then its lateral area = cm^2 .
- f) If the perimeter of base of a cube = 24 cm, then its total area = cm^2 .
- g) If the volume of a cube is 1000 cm^3 , then its total area = cm^2 .
- h) If the area of one face of a cube equals 9 cm^2 , then its total area = cm^2 .
- (Cairo 2016)
- i) The lateral area of a cube = the total area of the cube (in the simplest form).
- j) The ratio between the area of one face of a cube and the lateral area = :
(in the simplest form).
- k) If the lateral area of a cube is 100 cm^2 , then its total area = cm^2 .
- l) If the total area of a cube is 96 cm^2 , then the area of each one face = cm^2 .
- m) If the total area of a cube is 600 cm^2 , then its volume = cm^3 .
- n) If the total area of a cube is 150 cm^2 , then the area of one face = cm^2 .

(Cairo 2019)

- 11  If the edge length of a cube is 8 cm, then calculate the ratio between the lateral area and the total area.
-
- 12 A box in the shape of a cube without lid, the perimeter of one of its faces is 48 cm, calculate the total area.
-
- 13 A water tank in the form of a cube, its inner length is 1.5 m. We want to paint it to prevent the rust. If the cost price of painting one square metre is L.E. 20, calculate the total cost price of painting.
-
- 14 A room in the shape of a cube with edge length 4 metres, we want to paint its lateral walls and ceiling. If the cost price of painting one metre is L.E. 9, then calculate the total cost.
-
- 15  Youssef used a piece of cardboard in the form of rectangle, whose length is 1.2 m and width is 80 cm to form a cubic box whose edge length is 30 cm. Calculate the area of the remaining paper after forming the box.
-
- 16 **Complete the following table (consider that the unit length is measured in cm):**

Cube	Edge length	Lateral area	Total area
a) 	8	.....	.....
b)	.....	100	.....
c)	.....	.....	96

ceiling

سقف | tank

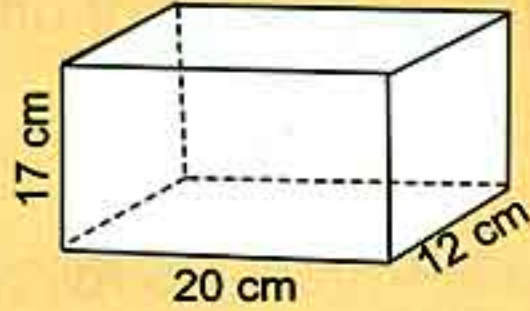
خزان | inner

داخلي

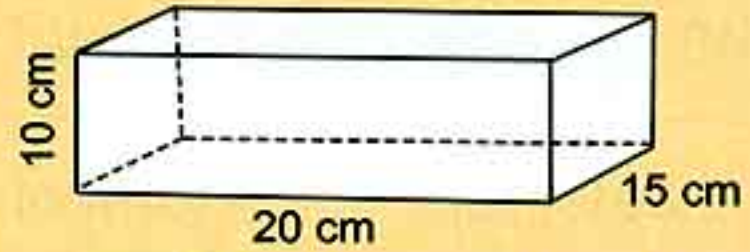
Second The cuboid:

17 Calculate the lateral and total area of the following:

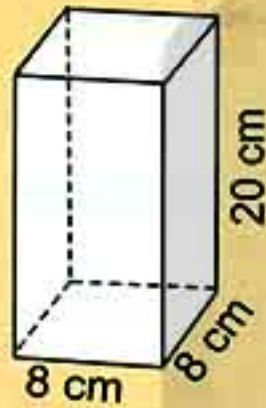
a)



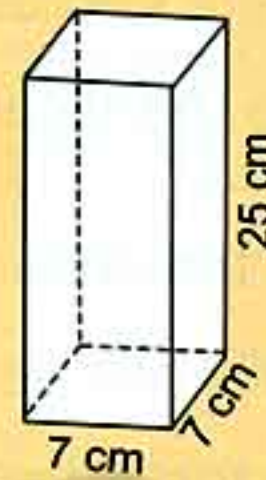
b)



c)




d)



18 Complete the following:

- a) The lateral area of the cuboid = × (Giza 2019)
- b) The total area of the cuboid = × (Fayoum 2011)
- c) If the length of a cuboid is 3 cm, its width is 2 cm and its height is 4 cm, then its lateral area = cm². (Giza 2019)
- d) If the dimensions of the base of a cuboid are 12 cm and 8 cm and its height is 10 cm, then its lateral area = (Cairo 2013)
- e) A cuboid, the perimeter of its base is 24 cm and its height is 13 cm, then its lateral area = cm².
- f) The lateral area of a cuboid is 130 cm² and the perimeter of its base is 26 cm, then its height = cm.
- g) If the lateral area of a cuboid is 36 cm² and the area of one of its bases is 18 cm², then its total area = cm².
- h) If the total area of a cuboid is 150 cm² and the lateral area is 90 cm², then its base area = cm².
- i) The height of a cuboid whose total area is 120 cm² and the dimensions of its base are 4 cm and 6 cm = cm.

19 Find the lateral and total area of a cuboid of length 7 cm, width 5 cm and height 9 cm.

20  A box without a lid whose length is 16 cm, width is 7 cm and height is 19 cm, calculate its lateral area and total area.

21 A box without a lid in the shape of a cuboid whose length is 20 cm, width is 10 cm and height is 3 dm, find its total area.



22 If a box is in the shape of a cuboid with a square base of length 9 cm and height of 20 cm, calculate the lateral and total area.


23 A cube of edge length 10 cm and a cuboid whose length is 8 cm, width is 5 cm and height is 17 cm, calculate the difference between their lateral areas.

24 A box without a lid in the shape of a cuboid with square base of side length 12 cm and height of 9 cm, find its lateral and total area.


25 A swimming pool, whose base dimensions are 40 m and 10 m and height is 2.5 metres.

Calculate the lateral and total area. (Menofia 2011)




26  A truck box in the form of cuboid, its inner dimensions are 5 m, 2.5 m and 1.6 m. We want to paint the inner box of the truck without the lid, knowing that the cost price of painting one square metre is L.E. 12. Calculate the cost price of the whole paint.





27  A truck box for carrying goods in the form of a cuboid, its inner dimensions are 4 m, 2.5 m and 1.8 m. We want to cover its sides and ceiling with an iron sheet. If the cost price of one square metre of the iron sheet is L.E. 15, calculate the cost of the whole required iron sheet.

28 A room in the shape of a cuboid with dimensions 9 m and 5 m and height 3 metres, we want to paint its walls and ceiling, if the cost price of painting one square metre is L.E. 15. Calculate the total cost.

29  A room whose length is 5 m, width is 4 m and height is 3.2 m. We want to paint its lateral walls and ceiling. If the cost price of painting one square metre is L.E. 8. Calculate the total cost, knowing that the room has 2 windows and a door whose areas are 8 m^2 .



30  A room of a square ground, its length is 4 m and its height is 3 m. It has a door, whose width is 90 cm and height is 2 m and two rectangular windows which are equal in area its of length 160 cm and width 100 cm. Calculate the cost of painting the walls, given that the cost price of painting one square metre is L.E. 9.

31  The inner dimensions of a swimming pool are 30 m, 10 m and 1.5 m. We want to cover it with a square-shaped tile, its side length is 20 cm. Find the number of the tiles required to cover the swimming pool.



32 A cuboid of base dimensions 13 cm and 7 cm and its lateral area is 120 cm. Find its height.

33 A cuboid of square base, its lateral area is 224 cm^2 and its height is 14 cm. Find the side lengths of its base.

34 A cuboid, its height is 15 cm and its base is in the shape of a rectangle whose perimeter is 90 cm and length is 30 cm, calculate the following:


- a) The lateral area of cuboid. b) The total area of cuboid.

35 A cuboid, the ratio between the dimensions of its bases is 5 : 3. If the perimeter of its base is 80 cm and its height is 10 cm. Find its total area.

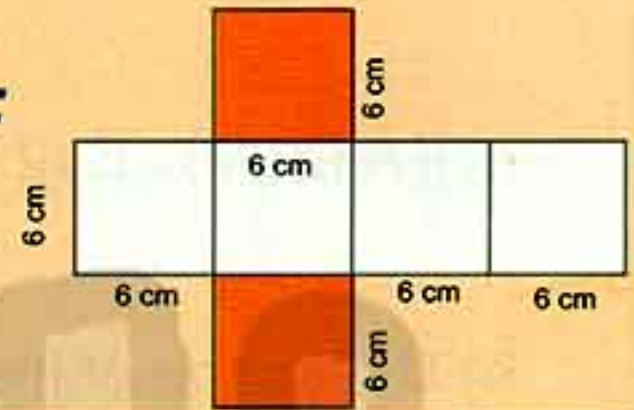
swimming pool حمام سباحة

- 36 A box without a lid in the shape of a cuboid, the inner dimensions of its base are 2 m and 3 m and its inner height is 1 m. It is wanted to cover its lateral faces and its floor by metallic sheets, the price of one square metre is L.E. 15, find the total price of the needed metallic sheets. *(Menofia 2017)*
- 37 A truck box for carrying goods in the shape of a cuboid whose inner dimensions are 4 m, 3 m and 2 m. It's wanted to cover its lateral faces and ceiling with an iron sheet that costs L.E. 30 per square metre, find the total cost of the iron sheets needed. *(Damietta 2017)*
- 38 If the total area of a cuboid is 180 cm^2 and the lateral area of this cuboid is 120 cm^2 with base perimeter of 20 cm, find the volume of the cuboid.

Cumulative Exercise

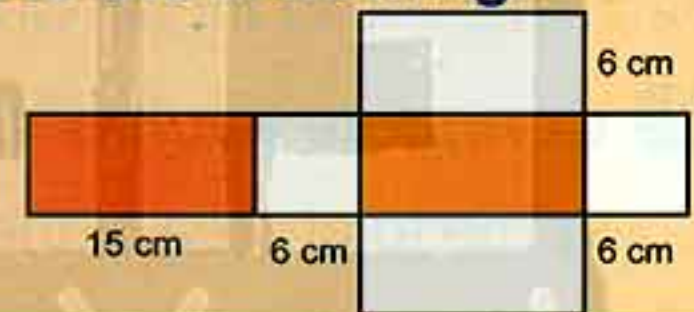
- 39  When folding the opposite shape, complete:

- a) The formed solid is
- b) The lateral area of this solid is
- c) The total area of this solid is



- 40  When folding the opposite figure, complete the following:

- a) The solid formed is
- b) The lateral area of the solid =
- c) The total area of the solid =

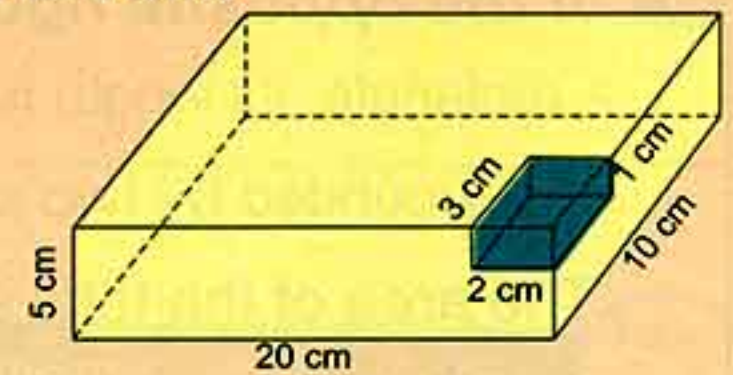


- 41 The ratio between the dimensions of a cuboid is $3 : 2 : 4$. If the sum of the three dimensions is 45 cm, find its lateral area.



Think and Explore

- 42 The sum of the lengths of the edges of a cuboid is 176 cm and the ratio between the dimensions of the base is $3 : 1$. If its height is 1.2 dm, find its total area.
- 43 A wooden cuboid whose dimensions are 20 cm, 10 cm and 5 cm, if a part of it is cut to form another cuboid whose dimensions are 3 cm, 2 cm and 1 cm, find the total area of the remaining part of the first cuboid and its volume.



Worksheet

Till Lesson (5) - Unit (1)

Total mark

25

3

1 Complete the following:

- a) $(-5)^2 + (-2)^3 = \dots\dots\dots$.
 b) $[(-2)^5 \times (-2)^4] \div (-2)^8 = \dots\dots\dots$.
 c) $(-6)^5 \div (-6)^3 = \dots\dots\dots$.
 d) $\mathbb{Z}^- \cup \mathbb{Z}^+ = \dots\dots\dots$.
 e) $\mathbb{Z} - \mathbb{N} = \dots\dots\dots$.
 f) The complement of \mathbb{N} relative to \mathbb{Z} is $\dots\dots\dots$

2 Put the suitable sign ($<$, $=$ or $>$) in each of the following:

- a) 4^2 16
 b) $(-5)^2$ (-10)
 c) $\frac{1}{3^5} \times 3^5$ $(75)^{\text{Zero}}$
 d) $(9)^2$ 18
 e) $2^{11} \div 2^9$ 2^2
 f) $(-4)^2 \times 3^2$ $(12)^3$

3 a) Arrange the following descendingly:

10^5 , $(-1)^7$, 100^2 , $(-10)^3$ and 1 000 000

b) Find the value of:

1) $\frac{3^4 \times (-3)^5}{3^7}$

2) $\frac{(-8)^7 \times (-8)^3}{(-8)^9}$

4 a) Check the closure property in addition and subtraction on

the set $X = \{-3, 7, 3, -1\}$

- b) The temperature on Tuesday in the morning in Cairo was 32°C while at night it dropped to 18°C . Calculate the decrease in the temperature.

5 a) Simplify each of the following to the simplest form:

1) $\frac{x^9}{x^3 \times x^2}$, where $(x \neq 0)$

2) $\frac{a^{12}}{a^7 \times a^2}$, where $(a \neq 0)$

b) If $a = -2$, $b = -1$ and $c = 3$, find the value of:

1) $a^2 + b^2$

2) $(a + b)^3$

Worksheet



Till Lesson (6) - Unit (1)

Total mark

25

1 Complete in the same pattern:

- a) 7, 10, 13, ,
 b) -15, -12, -9, ,
 c) -2, -4, -6, -8, ,
 d) 16, 12, 8, 4, ,
 e) $\frac{1}{3}$, $\frac{2}{3}$, 1, $\frac{4}{3}$, ,

5

2 Choose the correct answer:

- a) If $x = 1$, $y = -2$, then the negative number in the following is
 ($x + y^2$ or $x^2 - y$ or $x^2 + y$ or $x^2 + y^2$)
 b) $[8 + (-3)] \times (-3) = \dots\dots\dots$ (15 or -15 or 72 or -72)
 c) $4 + (-6) > \dots\dots\dots$ (2 or 0 or -2 or -4)
 d) $-7 \dots\dots\dots - |-9|$ ($>$ or $=$ or $<$ or \leq)
 e) $(-1)^3 - 1 = \dots\dots\dots$ (-2 or 0 or 1 or 2)

5

3 Write the number of dots below to each figure of the following:

Number of dots: (A) (B) (C) (D) (E)

The numerical pattern:

The rule of the pattern:



5

4 Complete the following table:

The numerical pattern	Description of the pattern
3, 7, 11, 15, 19, 23, .....	.....
.....	Each number is more than its preceding by 5
$\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1, \frac{5}{4}, \dots\dots\dots$	.....
.....	Each number is less than its preceding by 4
3, 9, 27, 81, .....	.....

5

5 Khaled decided to lose weight at the rate of 3 kg monthly. If he is 90 kg right now, then how many months does he need to reach 69 kg?

- Write the rule expressing the numerical pattern and describe it.

5

Unit (2)

Worksheet

On Lesson (1) - Unit (2)

Total mark

25

1 Choose the correct answer:

5

- a) The degree of the equation: $x^3 + 2x^2 = -4$ is (1st or 2nd or 3rd or 4th)
- b) $8 + |-8| =$ (8 or -8 or zero or 16)
- c) The solution set of the equation $2x - 3 = 1$ is if the substitution set is {0, 1, 2, 3}. ({0} or {1} or {2} or {3})
- d) The degree of the equation $x + 1 = 2$ is (1 or 2 or 3 or 4)
- e) Which of the following represents an equation? ($x - 17$ or $22 - 7$ or $x > -11$ or $2x + 3 = 7$)

2 Complete the following:

5

- a) 3, 9, 27, 81,, (in the same pattern).
- b) If $x = 2$, $y = 3$, then the value of $2xy =$
- c) If the substitution set is {0, 1, 2, 3, 4}, then the solution set of the inequality $x + 2 < 5$ is
- d) The degree of the equation: $2x^2 - x - 5 = 0$ is

3 a) Find the result of each of the following using the properties of addition and multiplication:

5

1) $6 \times ((-2) + (-7))$

2) $(-25) + 39 + 25$

b) Find the value of: $4 \times (-16) \times 25$

(Without using the calculator)

4 If the substitution set is $\{-4, -2, 0, 2\}$, find the S.S. of each of the following:

1) $2x + 1 = 5$

3) $2 + 3x = 7$

2) $2x + 5 \geq 3$

4) $4x - 3 = 9$

5 Complete in the same pattern:

4

a) $-24, -22, -20, \dots, \dots, \dots$

b) $\frac{1}{3}, \frac{2}{3}, 1, \frac{4}{3}, \dots, \dots, \dots$

c) $0, 1, 8, 27, 64, \dots, \dots, \dots$

d) $0, 1, 4, 9, \dots, \dots, \dots$

Worksheet

12

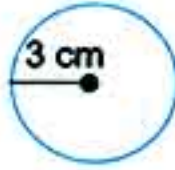
Till Lesson (3) - Unit (3)

Total mark

25

1 Calculate the area of each of the following circles:

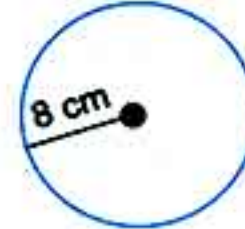
a)

Area = cm²

b)

Area = cm²

c)

Area = cm² $(\pi \approx 3.14)$

6

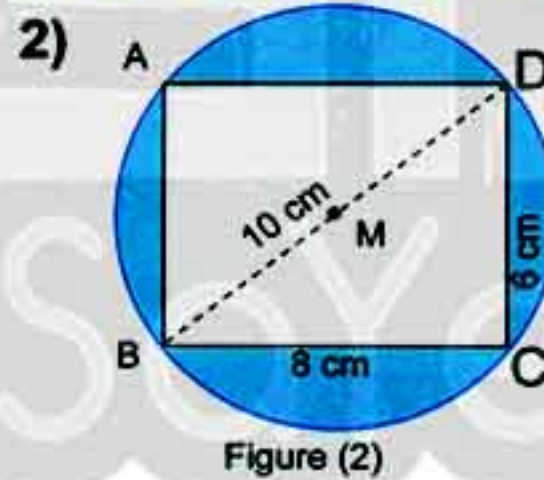
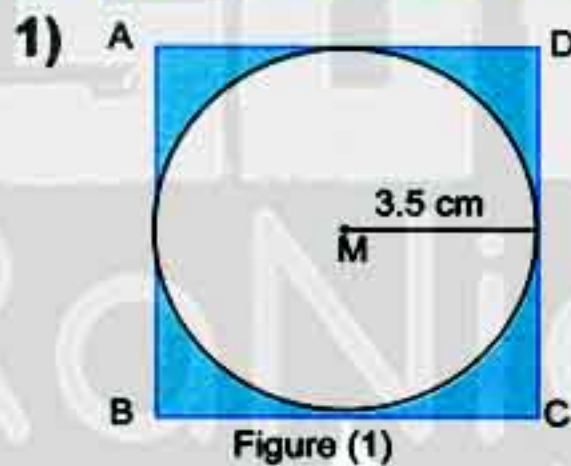
2 a) On the coordinate plane, find the image of AB where A (2, 2) and B (-1, 4) by translation (2, -3).

4

b) Find the circumference and the area of the circle whose diameter is 28 cm. $(\pi \approx \frac{22}{7})$ 3 a) Calculate: the radius length of the circle whose area is 7546 m². $(\pi \approx \frac{22}{7})$

6

b) Find the area of the shaded part in each of the following figures:

4 Solve each of the following in \mathbb{Z} :

a) $(4x + 3) + 8 = 31$

b) $\frac{x-3}{4} = 2$

c) $1 - 8x < 33$

d) $2x - 3 < 5$

4

5 a) Calculate the area of the circle whose circumference is 44 cm.

b) Determine on the Cartesian coordinate the image of rectangle ABCD where A (2, 3), B (2, 1), C (-2, 1) and D (-2, 3) by translation $(x + 3, y + 3)$.

What is the type of the shape A'B'C'D'?

5

Worksheet

13

Till Lesson (4) - Unit (3)

Total mark

.....

25

1 Choose the correct answer:

a) The image of the point A (-3,1) by translation $(x + 3, y + 2)$ is

((-3,0) or (0,3) or (-6,3) or (6,1))

b) The lateral area of a cube = the area of one face x

(2 or 3 or 4 or 6)

c) The lateral area of a cuboid with the perimeter of base 10 cm and height 4 cm = cm^2 .

(14 or 20 or 24 or 40)

d) The area of the circle with diameter length 20 cm = cm^2 .

(31.4 or 314 or 1256 or 12.56)

e) If the perimeter of one face of a cube = 12 cm, then its total area = cm^2 .

(53 or 54 or 55 or 56)

2 Complete the following:

a) The area of a circle with radius length 5 cm = $\pi \text{ cm}^2$.

b) The sum of the edge lengths of a cube equals 108 cm, then the length of each edge = cm.

c) The cuboid whose lateral area = 120 cm^2 and the perimeter of its base is 12 cm, then its height = cm.d) The image of the point (0,2) by translation $(x + 1, y + 3)$ is

e) If A (-2,7) and B (2,7), then AB = length units.

3 Determine the following on the Cartesian coordinate:

A (2, 2), B (2, -2), C (-2, -2) and D (-2, 2) and find its image by translation.

 $(x + 2, y + 1)$, then answer the following:

1) Mention the name of the shape.

2) Calculate the area of this shape.

4 a) A cube of edge length 6 cm, calculate its lateral area.

b) A circle whose diameter length = 42 cm is divided into six equal circular sectors.

Find the area of each sector. $(\pi \approx \frac{22}{7})$

5 Nada used a piece of cardboard in the shape of a square with side length 25 cm to design a box in the shape of a cube with side length 50 cm.

Calculate the area of the remaining paper.